

THE
Indian Medical Gazette

A MONTHLY JOURNAL OF

Medicine, Surgery, Public Health, and General Medical Intelligence
Indian and European

EDITED BY

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Vol. LX

(Founded in 1865)

CALCUTTA
THACKER, SPINK & CO
1925

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SUPPLEMENT.

THE INDIAN MEDICAL YEAR, 1924.*

THANKS to the kindness of a considerable number of contributors, it is possible to present a review of the Indian medical year, 1924, rather in the form of a symposium by several authorities than as a résumé by a single writer.

DISEASES OF THE TROPICS, EPIDEMIOLOGY, SYMPTOMATOLOGY AND TREATMENT.

Malaria.

One of the greatest advances made in recent years in connection with malaria is the introduction in the Punjab of malarial forecasts, year by year, by Lieutenant-Colonel C. A. Gill, based on his study of the meteorological conditions under which malaria spreads. For four years in succession malarial forecasts have been made for the Punjab, and have turned out to be remarkably accurate. Given such an accurate forecast, it is possible to mobilise personnel at the danger areas in advance and to take measures beforehand, and these forecasts are now acted upon by the public health organisation of the province, and by the Director of Medical Services, India. The publication of Colonel Gill's forthcoming book on the rôle of meteorology in epidemic malaria will be awaited with much interest.

Lieutenant-Colonel S. R. Christophers, in a paper which deserves to become a classic, gives a vivid description of the conditions present in a hyper-endemic area (Singhbhum). There is a regular co-ordinated sequence of events, a precise study of which constitutes what is almost a new science. During the first two years of life every child in the community suffers almost continuously from acute febrile infestation; parasites to the number of some 10,000 per c.mm. being continuously present in the blood, and the spleen enlarged some 5 cms. below the costal margin. Next comes a stage of immune infestation, which lasts throughout childhood into adult life; by about the third year of life—or of age-residence in the case of children who have come to live in the area—the number of parasites has dropped to about 1,300 per c.mm., and fever occurs only about once a fortnight, the spleen, however, being even larger than before. Among the adults the spleen rate was 50 per cent., the number of parasites only about 100 per c.mm. of blood, and the adult has become immune and is afebrile; the condition indeed resembling the "salting" of animals which occurs in trypanosomiasis and piroplasmosis.

The same author, with Rai Sahib Kazan Chand, sets up a standard method of measuring enlarged spleens in doing survey work, the measurement being expressed in cms., and a table given for correction in accordance with the sitting height, age or nipple-umbilicus line. Measurements are recommended from the lower pole of the spleen to the umbilicus and to the mid-line of the body, and a standard chart given together with a notation which gives standard results of effectiveness and precision. In a further paper, Colonel Christophers also gives the frequency distribution of measurements of enlarged spleens in a malarious child community, and raises the question of the relationship of the size of the spleen to the number of attacks and relapses suffered.

Hill-station malaria has attracted a good deal of attention during the year. In a study of malaria in Shillong, Lieutenant-Colonel T. C. McCombie Young shows *A. maculatus* to be the important local carrier, and that it breeds in the river pools in the Um Kra stream, the rice fields being less important. Should the rainfall in the early phase of the monsoon be heavy,

these pools are scoured out and the year is relatively non-malarious. A system of contour drainage is recommended. The same subject is also dealt with by Major H. E. Shortt. The malarial season in Shillong is from June to October; and of late years the disease has become increasingly prevalent. The spleen rate among the indigenous Khasis is very low, but the Pasteur Institute patients constitute a continuous reservoir of the infection in the neighbourhood of the Um Kra and Um Shirpi streams where *A. maculatus* breeds. These streams should be canalised.

On Ambootia Tea Estate, Kurseong, Dr. C. Strickland shows that *A. maculatus* and *A. willmori* are the carriers, and there is a close relationship between rainfall and malaria. Should the early rains be heavy, the breeding places are scoured out and a year of low malarial incidence follows; in fact the curve of severity of the monsoon and of malarial incidence in the next year are in an inverse relationship. In a second paper he contrasts the conditions present in Kurseong and Shillong respectively.

An interesting account of the anti-malarial measures in connection with the Back Bay reclamation scheme, Bombay, is given by Captain B. S. Chalam. In view of the great prevalence of malaria in connection with previous reclamation schemes, Colonel Christophers was invited to visit Bombay in 1923 in connection with the Back Bay scheme, and advised the services of a whole-time officer. The organisation instituted has grappled very successfully with the problem, the whole area being divided into sectors, each of which is covered twice a week by the search and larvicide parties respectively. The chief carriers are *A. stephensi*, *A. culicifacies* and *A. vagus*, with *A. rossii* also prevalent; and the chief breeding places which have required attention are the mouths of the sludge pipes, joints of pipes where leakage occurs, fissures in the drying sludge, and depressions in the new land surface. Work has also been necessary in the adjacent areas in Colaba, and much public health propaganda work is being carried out. Admissions to Colaba hospital for malaria among British troops have fallen from 973 in 1921, to 418 in 1923, and to 169 in 1924.

In Assam, Dr. Strickland incriminates *A. umbrosus*, which breeds in cut bamboo stumps, as an important vector, whilst in Madras, Dr. D. A. Turkhud reports, that special measures had to be taken to deal with epidemic malaria in the work of the Forest Department at Sappal Hill and Top Slip. Drs. Ramaswami Iyer and K. P. Menon were specially trained and sent to the two areas respectively, and have submitted detailed reports and recommendations for the consideration of government. What can be accomplished, even by partial measures alone, is described by Major J. A. S. Phillips in connection with five towns in the U. P. Here, although all that was desirable could not be carried out, yet the results of partial measures during the last 14 years or so have been as follows:—in Saharanpur a reduction of the spleen rate from 79 to 7 per cent., in Nagina from 79 to 13 per cent., in Kosi from 81 to 42 per cent., in Meerut from 6 to 1.3 per cent., and in Lucknow from 2.2 to 1.6 per cent., together with greatly reduced fever rates.

Turning to symptomatology, R. K. Handa describes a case of malaria associated with Raynaud's disease and fatal gangrene of the legs; whilst Major J. A. Sinton and R. B. Lal deal with albuminuria in malaria. Its incidence in 64 malignant tertian cases treated between August and mid-September was 18.7 per cent., and in 110 cases treated between mid-September and mid-October was 12.4 per cent. The combination of quinine with alkalies in the doses given had no deleterious effect on the kidneys, and the results show a slight diminution in the incidence of albuminuria in the cases treated with alkalies. Major Sinton has introduced a most ingenious method for enumerating the parasites and leucocytes in malarial blood. A standard suspension of the nucleated red

* Unless otherwise stated, the commissioned officers referred to are all officers of the Indian Medical Service.

corpuscles of fowls is made in 1 in 3,000 perchloride of mercury solution, so that 1 c.mm. = 20,000 cells. The malarial blood is then mixed with an equal volume of this suspension, and the mixed fluid spread in a thick smear, when, as the number of nucleated cells is known, the number of parasites or leucocytes can easily be arrived at. Major T. A. Hughes found a condition of latent hæmolytic jaundice to be present in four cases of hepatic cirrhosis with enlargement of the spleen and ascites by the van den Bergh test, and considers that a similar condition may be present in individuals continually resident in malarial districts, who show no clinical signs of active malaria. Working with Major Sinton, a study of the functional capacity of the liver in malaria was made, as measured by the lævulose tolerance test. There may be some disturbance of the glycogenetic function of the liver in a certain number of ordinary acute cases of malaria, but the degree of inefficiency found was not marked. In cases showing pernicious symptoms the inefficiency would probably be greater. The ingestion of glucose or lævulose is indicated in all cases of malaria, more especially in severe cases, to protect the liver cells and prevent further damage to the other functions of the liver, which are protected by the glycogen reserve of this organ.

In continuation of his former studies, Major Sinton with sub-assistant surgeon J. D. Baily, I.M.D., draws attention to the "acidosis"—or rather lowered alkali reserve—in malaria. The amount of sodium bicarbonate required to render the urine of healthy Indians alkaline to litmus was found to be on an average 6.5 grammes, whereas in a series of ordinary cases of malaria the corresponding amount was found to be 14 grammes.

Turning to treatment, Majors H. W. Acton, and R. Knowles advocate a standard treatment for malaria with Indian cinchona febrifuge. The diagnosis should first be established by finding the parasite in blood films,—(in which connection the thick film method advocated by Knowles and Das Gupta is exceedingly useful), and the patient should then be continuously cinchonised for 31 days, the urine being tested to ensure that he is taking his medicine. The timing of the dose is important; it should be given on an empty stomach 2 to 2½ hours after meals. For algid, comatose and severe cases, 7½ to 10 grains of quinine bihydrobromide, given intravenously in 15 to 20 c.c. of saline, is the best line of treatment, the patient usually being able thereafter to take the cinchona febrifuge prescription orally. Major O. A. R. Berkeley-Hill reports that of 35 cases of benign tertian malaria treated orally with cinchona febrifuge on the above lines, and carefully watched over a successive period of some months, only 4 relapsed—at intervals of from 2 weeks to 2 months after completing treatment. He is collecting observations for publication at the Ranchi Mental Hospital where patients can be kept under observation for considerable periods. Based upon Acton and Knowles' formula, Dr. T. H. Bishop advocates the following prescription, which is now in use all over the E. B. Railway system, and which he states is pleasanter and far more palatable than a quinine mixture:—

Pulv. cinchona febrifuge, 10 grains; acidi citrici 20 grains, magnesii sulphatis 20 grains, spiriti anisi 10 minims, syrapi simplicis to half an ounce.

Dose; half oz. b.d. or t.d.s. two hours after food.

Dr. U. N. Brahmachari deals with the treatment of difficult cases of malaria. Quinine salts being markedly hæmolytic, he uses an anti-hæmolytic solution for intravenous administration, of the following composition:—

Quinine alkaloid 5 grains, alcohol 50 minims, urethane 3 grains, calcii chloridi 7½ grains, glucose 300 grains, and normal saline 300 c.c.

This should be administered slowly at the rate of not more than 10 c.c. per minute and might prove suitable for cases of blackwater fever.

Majors R. N. Chopra and Knowles, with Assistant-Surgeon J. C. Gupta record the absolute failure of *Vitex peduncularis* in the treatment of malaria, whilst

Dr. Bayley-de Castro records the case of a woman six months pregnant, suffering from mixed benign and malignant tertian malaria, together with typhoid fever, who recovered after treatment with intravenous quinine.

Plague.

Most of the work of the year has been on anti-plague vaccines. Major W. D. H. Stevenson and the late Khan Bahadur R. J. Kapadia record the results of inoculating rats with vaccine. Not only does the inoculation protect, but even in such rats as get plague thereafter it delays the fatal issue. The immunity conferred varied with the dose given, and the potency of the vaccine was found to vary with the virulence of the strain used. Long stored vaccines gave but little reaction and are of low toxicity. Vaccines incubated 6 weeks to 2 months are much more potent than vaccines incubated for more than 3 months. Vaccines 1 year and 2 months old were still strongly protective; protective value was even retained in vaccine 2 years old. It is recommended that vaccines should be used incubated from 6 weeks to 2 months, and kept after sterilisation for some months.

From Parel Lieutenant-Colonel F. P. Mackie reports on the work of Major Morrison, Captain B. P. B. Naidu (T. C.), and Dr. C. R. Avari, as follows:—

"From the middle of August 1923, Major Morrison with the assistance of Dr. Naidu (who received a grant from the Indian Research Fund Association for this purpose) and Dr. Avari carried out experiments until the middle of April 1924, when he went on leave.

"These experiments were continued throughout 1924 by Dr. Naidu and Dr. Avari with the assistance of Captain Malone who joined this Laboratory in April 1924.

"The object of these experiments is to discover some means by which Haffkine's plague prophylactic may be improved so that its potency may be increased, while its 'toxicity' (as judged by the local and general reaction which follows its inoculation into man) may be diminished.

"Haffkine's plague prophylactic is a whole vaccine composed of the culture medium (the nutrient broth) with the plague bacilli grown in it for a period of six to eight weeks and the products of their metabolism. This is sterilised by heat and 0.5 per cent. carbolic acid is added to ensure its sterility. Four c.c. of this vaccine are administered subcutaneously for a prophylactic dose. Since its introduction as a prophylactic measure, this vaccine has undergone little or no change in the method of its manufacture.

"(a) The first series of experiments was to determine which of the constituents of Haffkine's prophylactic fluid was responsible for the toxic and immunising properties.

"The prophylactic when centrifuged or allowed to settle separates into a clear supernatant fluid and a compact sediment consisting of bacillary debris.

"The whole prophylactic, the sediment and the supernatant fluid respectively, for each brew concerned, were tested and compared with regard to their toxic and immunising properties.

"The results of these experiments are:—

"1. Rats imported from Madras for these experiments, when infected with 0.003 milligram of spleen of a plague-infected rat, showed a mortality of 95.3 per cent. within ten days of infection.

"2. Nutrient broth from which Haffkine's prophylactic is made is not toxic to rats and it has no immunising value.

"3. The whole prophylactic given in a dose of 0.5 c.c. killed 35 per cent. of the rats from toxæmia and produced an immunity which reduced the mortality from 95.3 per cent. to 55.6 per cent.

"4. The sediment from 0.5 c.c. of Haffkine's prophylactic showed neither toxic nor immunising properties.

"5. The supernatant fluid caused a mortality of 19.8 per cent. from toxæmia and produced an immunity which reduced the mortality to 53.11 per cent.

"(b) Anti-plague vaccines prepared from agar cultures, are manufactured for prophylactic use in Germany, France and England.

"Therefore, a series of experiments was next carried out to compare the toxicity and protective value of vaccines prepared from agar cultures with Haffkine's prophylactic. The results of these experiments are:—

"1. When compared with 0.5 c.c. of Haffkine's prophylactic, agar cultures treated with formalin and acetone are not toxic and show no evidence of immunising power, even in doses of 12.5 milligrams.

"2. Agar cultures treated with chloroform vapour and 1 per cent. carbolic acid show no immunising power until the weight of the dried vaccine exceeds 13.6 milligrams.

"3. Agar cultures treated with 1 per cent. carbolic acid possess immunising properties when used in a dose of 8 milligrams.

"4. Agar cultures sterilised and carbolised in the same way as Haffkine's prophylactic, when used in doses of 4 milligrams, possess toxic and immunising values equivalent to 0.5 c.c. of Haffkine's prophylactic.

"5. Only with heated vaccine does the toxicity regularly increase with the dose.

"(c) Besredka's method of immunisation by oral administration of vaccines against typhoid, dysentery and cholera has been recently tried by M. Legar and A. Baurry in the case of plague, who claim some measure of success in their experiments. It would be a great advance in prophylactic methods if the vaccine could be administered orally, as subcutaneous inoculation excites a good deal of inflammatory reaction.

"A series of experiments were undertaken on the lines suggested by M. Legar and A. Baurry.

"Results of these experiments are:—

"1. Rats which are very satisfactory for estimating the prophylactic value of plague vaccines, when administered subcutaneously, are not suitable animals for the oral administration of bile and vaccine. They have not been induced to eat baits prepared with bile, and when bile is administered by a catheter they apparently die readily of oedema of the glottis.

"2. Guinea-pigs can be fed with bile by a catheter. The treated guinea-pigs receiving doses similar to those given by M. Legar and A. Baurry afford no evidence that any immunity is conferred by the oral administration of bile and the plague prophylactic, or by the oral administration of the plague prophylactic alone.

"As these experiments do not demonstrate any superiority of agar-grown vaccines over Haffkine's plague prophylactic, and as the method of preparing vaccines from agar cultures on so large a scale as is done at this Laboratory is not feasible, further enquiries are confined to the prophylactic, as to how the toxicity of the vaccine could be reduced and its immunising power increased.

"The factors which are considered to have most influence on the efficacy of the plague prophylactic are:—

"(1) The medium employed for the growth of plague bacilli;

"(2) the seed virus and its virulence;

"(3) the period of incubation; and

"(4) the period of storage.

"Investigations are now in progress to determine if the prophylactic can be improved by modifying one or more of the above factors."

It will be seen from Colonel Mackie's report that there is every hope of considerable improvement in the vaccine in the near future.

In treatment, Majors C. J. Stocker and G. F. Graham have studied the use of a sensitised vaccine in a local outbreak at Hoti Mardan. The agglutinating powers of the sera used were tested with the washed sediment of Haffkine's vaccine, pigeons being used for serum production. It was found best not to heat the vaccine

after sensitisation. The following are their results:—

17 cases not previously inoculated; treated with the new vaccine; 1 died = 8 per cent.,

18 not previously inoculated; not treated; 11 died = 61 per cent.

12 cases previously inoculated; treated with the new vaccine; 1 died = 8 per cent.

whilst the general mortality in plague in inoculated persons is about 12 per cent. If a sensitised vaccine will reduce the mortality in plague from 61 to 29 per cent., it may prove a very valuable therapeutic agent.

Several workers are treating plague by intravenous injections of iodine, but as far as the writer is aware no large series of results has as yet been published. R. D. Pal reports a case of acute but transient oedema of the glottis following on such an injection.

The Milroy lectures on plague, were delivered by Lieutenant-Colonel W. Glen Liston, and form an admirable account of the historic work of the Plague Commission.

Cholera.

Dr. P. T. Patel gives an account of the 1923 outbreak in Bombay. The infection was imported with Haj pilgrims from Bengal, and 182 cases were admitted with 58 deaths, a mortality of 32 per cent. Treatment was by hypertonic saline, permanganate pills, atropine hypodermically and kaolin emulsion. The cholera vibrio was isolated from 129 of the cases.

Majors Acton and Chopra describe the nature and pharmacological action of the cholera toxin. The vibrio can liquefy gelatine, reduce the amino-acid tryptophane to indol, and decarboxylate amino-acids into poisonous bases. A 10 days old culture in veal broth contains both volatile and non-volatile bases. When separately tested, the volatile bases were found to be almost non-toxic, but caused tonic contraction of the rabbit's intestine. The non-volatile bases, and especially their argentine fraction, are toxic; and cause a fall of blood pressure, an oxytoxic action on the pregnant uterus, thus causing miscarriages, and have a direct action on the secreting tubules of the kidney. The production in experimental animals of every symptom of cholera by these bases, freed from all bacteria, is a striking example of the exactness of modern biochemical methods. The optimum conditions for the production of the poisonous bases were found to be a supply of the necessary amino-acids, a pH on the alkaline side, and a liberal supply of oxygen.

Dr. J. W. Tomb contributes further figures with regard to his essential oils' mixture. In 1923 in the Asansol mining area there were 345 cases of (clinical) cholera, 2,156 contacts of these cases were treated with the mixture, and not a single case of cholera occurred among them; had the experience of previous years been repeated, some 132 cases should have occurred among this number of contacts. Lieutenant-Colonel F. J. Palmer, R.A.M.C. (retd.), is a strong advocate of cresol; 1 to 4 minims according to age, given every quarter of an hour in the same number of ozs. of water for two hours; then at increasing intervals of $\frac{1}{2}$ hour, 1 hour, 2 hours, etc., the amount of cresol being gradually reduced. As the patient convalesces, the greatest care must be taken against too rapid an increase of diet; whilst for uræmic cases nasal tube feeding may have to be resorted to. Care should be taken in selecting the brand of cresol used, sanitol being advocated. He records 61 cases treated with 12 deaths, 19.6 per cent. mortality. Lieutenant-Colonel W. C. Ross gives comparative figures, on only a small scale, however, for different methods of treating cholera. He holds that for general use, and especially in village practice and outlying dispensaries, kaolin is the best line of treatment, supplemented with permanganate drinks; 2 deaths in 13 cases. The same conclusion is come to by S. C. Chatterjee on four small series of cases, treated by different methods and compared as to results.

In Madras a severe outbreak at Vaniyambadi in N. Arcot district was investigated by Assistant Surgeon N.

Seshadrinathan; the water supply was found to be infected, but prompt measures arrested the outbreak.

In connection with his enquiry into cholera in the coal-fields, Captain G. C. Maitra writes:—

"An enquiry into the bacteriology of clinical cholera cases in the Jheria coal-fields showed that while it was relatively easy to recover cholera vibrios from the stools of cases in an epidemic outbreak, vibrios were often found absent in the stools of sporadic cases both microscopically and culturally. This necessitated a study of the bacteriology of suspected cholera cases in one of the Calcutta hospitals under favourable laboratory facilities. A year's experience shows that the vibrios disappear from the stools more rapidly than they are usually thought to do. In a series of 500 cholera cases examined in Calcutta within 48 hours of onset, they were found only in 84 per cent. of the stool films and then only after very careful search. On the other hand 98 per cent. of these stool films showed necrosed epithelial cells from the intestinal mucosa for which the cholera poison has a selective action. These cells persist even after the vibrios have disappeared and constitute an important point in the cyto-diagnosis of the cholera group of diseases.

As regards the cultivation of cholera vibrios from stools, complicated and differential media, such as MacConkey's and Dieudonné's were found of very little use. Ordinary agar, either alone or in combination with 0.5 per cent. bile-salt (sodium taurocholate) was quite enough for the isolation of vibrios from the majority of cases. The chief obstacle to a successful culture was not so much the organisms of the *coli* group as the putrefactive bacteria of the *proteus* group. The activities of the latter could however be checked by adding a small quantity of bile-salt, with very little interference to the growth of the vibronic colonies.

The employment of simpler media greatly helped the bacteriological study of suspected cholera cases in Calcutta. Out of a total of 750 cases examined during the year, positive cultures of vibrios were obtained in 80 per cent. of cases. Of the positive series 85 per cent. were cases of true cholera due to Koch's comma vibrio, and 15 per cent. were cases of para-cholera due to cholera-like vibrios. The majority of these cholera-like infections were found associated with benign cases of clinical cholera and most probably they constituted the bulk of the sporadic cases observed in the coal-fields.

The possibility of inducing immunity against cholera and bacillary dysentery by oral vaccination was tested on rabbits. The protection offered against cholera by this method was found to be more pronounced than that against dysentery. These experiments have been continued with a view to omitting the ox-bile which was originally recommended by Professor Besredka in combination with the cholera vaccine. A combination of Shiga and cholera vaccines gives almost the same result on experimental animals as bile and cholera vaccine. But the number of experiments to date is too small to warrant definite conclusions.

A polyvalent vaccine containing representative strains of dysentery bacilli found locally has been issued lately to 3 selected jails in Bengal for trial. The time is not yet ripe for a consideration of the results."

Dysentery and Amœbiasis.

Two important papers are those by Lieutenant-Colonel J. Cunningham and Assistant Surgeons J. H. Theodore and K. Y. Krishnan on latent dysentery. These workers show that if the stools of a general population be macroscopically examined, it is found that a certain percentage are passing mucus in the stools without accompanying symptoms, a condition of latent dysentery. Twelve consecutive examinations are sufficient to identify all the latent dysentery carriers in the population of a given institution, and to establish the "dysentery index." Such indices were 19.8 per cent. in jails in Eastern Bengal, 27.6 per cent. at Cannanore and 30.9 per cent. at Bellary among Moplah prisoners. The detection and

isolation and treatment of such cases is of the greatest importance as a practical measure of dysentery control, and the method is well worth adopting by any jail superintendent who is troubled with dysentery in his jail. No less than 63 out of 234 prisoners working in cook-houses were found to be latent dysentery cases. A further practical application of Colonel Cunningham's method is that by Assistant Surgeons N. Seshadrinathan and J. H. Theodore in connection with an outbreak of gastro-enteritis among the Moplah prisoners at Alipuram jail. A thorough examination of cases, contacts, convalescents and carriers showed that the epidemic was only an acute exacerbation of latent dysentery due to Flexner's bacillus. The epidemic was rapidly brought under control by the use of polyvalent anti-dysentery serum, inspection of stools for the identification and segregation of latent cases, protection of water supplies, and the strict isolation of the kitchen gang, with elimination of latent dysenteries from them.

With regard to "heathy" *E. histolytica* carriers, Majors Acton and Knowles claim that the condition is not always as free from symptoms as is usually supposed. There is always present some degree of ulceration of the colon mucosa, and such ulceration may lead to hæmolytic streptococci from the gut invading the blood stream. The results of such "streptococcal showers" in the blood stream may be unexpected symptoms, such as asthma, leucoderma, urticaria, sciatia, giant urticaria, etc. In these conditions the stools should always be examined for *E. histolytica* cysts, because if such are found and the condition treated, the primary disease may also be benefited.

A study of the bacillary carrier question by Assistant Surgeon H. Rai in the villages around Kasauli gave positive findings of dysentery bacilli in 5.4 per cent. of 201 stools examined, and showed that some 4 per cent. of the village population were bacillary dysentery carriers, chiefly of organisms of the Flexner group. Much of what is loosely written down as hill-diarrhoea is almost certainly Flexner bacillus infection.

The publication of Fletcher and Jepps' "Dysentery in the Federated Malay States," reviewed in our issue for last September, is an incident of the year. The book is one of great value and should be in the hands of every medical practitioner in the tropics.

Majors Acton and Knowles, in an article on the dysenteries of India illustrated with a colour plate, attempt to put together in a nutshell the lessons of the war and of the huge volume of work of recent years on dysentery. There have been considerable changes at the Calcutta School of Tropical Medicine in the treatment of amœbic dysentery, however, since that paper was published. At the present time comparative studies are in progress as to the relative value of (a) emetine; (b) kurchi; (c) stovarsol; and (d) yatren in cases of *E. histolytica* infection, with a view to collecting observations on a large scale for comparison. It is as yet perhaps too early to make any definite statement, but the results to date with stovarsol, (May and Baker) seem very promising. Up to date 8 cases of amœbic dysentery and two of lambliaias have apparently cleared up completely on stovarsol treatment. The treatment is simplicity itself, the administration twice a day of one 4 grain tablet of stovarsol orally with food. The drug is at least worth an extended trial.

(In connection with the above two papers by Majors Acton and Knowles, Messrs. Thacker, Spink have recently published a small handbook on the dysenteries of India by these authors, illustrated with colour plates of intestinal protozoa in both the vegetative and encysted phases, and dealing with the whole subject for the general practitioner and laboratory worker in this country at Rs. 1-8; a first essay in the production, it is hoped, of a series of such small text books on tropical diseases, published at a price to be within the reach of the Indian medical student and general practitioner.)

In the treatment of amœbiasis with emetine there are certain dangers which must be guarded against. Thus, as Major R. N. Chopra, Drs. B. N. Ghosh and P. De show, the drug is a general protoplasmic poison, with special toxicity for the cardiac muscle, and with a selective destructive action on the endothelium of the capillaries throughout the body. Prolonged administration also causes congestion and fatty infiltration of the liver and kidneys. The administration must be controlled and watched. In the paper by Acton and Knowles a course of six days of administration of large doses of bismuth carbonate together with emetine subcutaneously was advocated; but both workers now prefer a continuous nine days' course of the bismuth treatment, together with one grain of emetine a day, given intravenously. Major F. J. W. Porter, R.A.M.C. (ret.), also advocates the intravenous use of emetine, giving it in half-grain doses twice daily in acute amœbic dysentery, with or without 1/12th of a grain of morphia; and in liver abscess in doses of 1 grain twice a day intravenously. S. Mulherji draws attention to the advisability of simultaneous or preliminary anti-helminthic treatment in cases of dysentery in India, since such infections are frequently present as complications.

Captain A. Sargood Fry records the cure of two remarkable cases of large *amœbic abscess of the liver* by emetine therapy alone, unaccompanied by any aspiration. There seems to be no necessity to aspirate in all cases. Once the entamœbæ in the liver tissue are killed, inasmuch as the pus is sterile, it will behave like a healing tubercular abscess and undergo spontaneous absorption and resolution. In both patients co-existing helminthic infections required treatment.

Lieutenant-Colonel J. W. D. Megaw and Captain G. C. Maïtra draw attention to chronic dysenteric peritonitis as a possible cause of ascites in Indians and the condition of "morbus bengalensis" described so many years ago by Norman Cheevers. The chief causes of ascites in India differ markedly from those in England; and many patients are encountered who show no hepatic cirrhosis, but give a history of dysentery. Of 50 such cases investigated 31 gave positive agglutinations to Flexner's bacillus at titres of from 1 in 16 to 1 in 80, whereas controls showed agglutinins in a much smaller proportion of cases.

Sprue.

The problem of the real causation and ætiology of sprue still remains unsolved, but a serious attempt is being made to solve it at the Bombay Bacteriological Laboratory. Lieutenant-Colonel F. P. Mackie writes as follows:—

"Some preliminary investigations into the causation of sprue have been in progress for more than a year and a considerable body of evidence has been collected, particularly as regards the vexed question of *Monilia* infection of the intestinal tract. Numbers of type cultures have been obtained from Europe and have been compared with strains isolated locally. This aspect of the work has been in the hands of Colonel Mackie and Dr. Chitré and the classification of yeasts is being continued.

"The question is a very complex one and the whole question to taxonomy is in a chaotic state.

"An attempt is being made to simplify the classification of intestinal yeasts, which has become needlessly complicated by the acceptance of minute variations in sugar reactions being accepted as indicating special or generic difference. The observers have not satisfied themselves that there are yeasts which are in any way specific to sprue and on this point are at variance with the findings of Ashford and others.

"They also consider that *Monilia* infestations are in all probability incidental to the development of sprue, and are not causative, though their presence may explain certain of the intestinal symptoms and signs.

"The serological side of the yeast problem is being

taken up by Dr. N. H. Fairley, whilst the intestinal flora is being studied by Dr. Goré.

"The biochemical aspect of sprue is receiving attention at the hands of Dr. Fairley and Colonel Mackie, assisted by Mr. Malandkar who is temporarily in charge of the recently established biochemical unit.

"Some work has already been done on the fat content of the faeces which points to non-absorption or excessive secretion of intestinal fat and a probable deficiency of lipase. Other biochemical problems which await investigation are the fat and calcium content of the blood, the functional efficiency of the stomach, intestine, liver and pancreas.

"The clinical aspect of the disease, together with its hæmatology and morbid anatomy, are also being investigated, but it is probable that it will need at least two more years of work before any publication dealing with this highly complex disease will be justified."

Enteric Fevers.

A valuable paper is that by Lieutenant-Colonel J. W. Cornwall and Assistant Surgeon H. M. Lafrenais, I.M.D., on the mechanism of infection by *B. typhosus*. These workers find that the stomach of the rabbit presents an absolute barrier to experimental infection, but that if the bacilli are introduced directly into the jejunum infection takes place and typhoid bacilli can be found in the circulating blood within an hour. Given certain conditions, the *B. typhosus* will pass the stomach barrier of man; if these do not prevail, however, the stomach presents an absolute barrier. The bacillus can pass through the skin, also probably through the conjunctiva and nasal and pharyngeal mucosa, but these are unlikely channels of infection in man. If any local immunity of the intestinal epithelium can be produced, it can be tested for by the intra-jejunal injection of living typhoid bacilli. The immunity in man depends on (a) the ability of the ectoderm to prevent passage of bacilli through it; (b) the ability of the cells of the mesoderm to withstand toxins. *B. typhosus* may occasionally lie latent for many months in the tissues (of a rabbit), and then suddenly break its bounds and cause a fatal issue.

In diagnosis A. Bayley-de Castro emphasises the great value of Marris's atropine test. Four cases were tested between the 9th and 14th day of disease, and all gave markedly positive results.

Major J. A. Cruickshank draws attention to the possible value of prophylactic inoculation of convalescent enteric cases in order to reduce the percentage of carriers in any given military or other population, basing his observations on 1886 convalescent cases studied at Parel during the war. Those not inoculated prior to the onset of enteric fever gave a carrier incidence of 3.2 per cent.; those previously inoculated of only 0.5 per cent.

With regard to the causative bacilli, Lieutenant-Colonel J. W. Cornwall has studied the changes in media produced by the *B. typhosus*. Milk media, however prepared, as long as the pH is not below 7.2, show acid production within the first 24 hours. Milk clarified by sodium citrate becomes milky during the growth of certain species of bacteria in it. If the pH is lower than 7.2, however, acid production is not observed within the first 24 hours. After sterilisation of peptone water, glucose-peptone water and rabbit serum at 37°C., spontaneous changes may occur in the reaction of the media. Dr. S. N. Goré at Parel has been studying the colityphoid group of bacteria, and proposes a new method of classification. Colonel Mackie reports as follows:—

"Dr. S. N. Goré is studying the aerobic bacilli isolated from faeces obtained from healthy persons and from cases of diarrhoea, dysentery and sprue, according to the method of procedure he has outlined for the classification of such bacilli (vide *Indian Jl. Med. Res.*, July, 1924).

"He has classified these bacilli into three principal groups according as to whether they ferment glucose

and lactose or not. Group I comprises bacilli which completely ferment glucose and lactose, like those belonging to the colon-aerogenes group; Group II, bacilli which completely ferment glucose only, like those of the paratyphoid-Gaertner-Morgan group; and Group III, bacilli which only partially ferment glucose, like those of the typhoid-dysentery group. These three groups he has designated by the formulae GL, G, and g, respectively.

"The results of the study of 120 samples of faeces are summarised in the following table:—

| No. of samples of faeces. | Samples of faeces obtained from:— | Number of samples of faeces containing bacilli belonging to groups:— | | | |
|---------------------------|--|--|-----------|-----------|--------------|
| | | GL. | GL and G. | GL and g. | GL, G and g. |
| 17 | Healthy persons .. | 17 | Nil. | Nil. | Nil. |
| 17 | Healthy inmates during a small epidemic of typhoid fever in a reformatory. | 10 | 6 | 1 | Nil. |
| 17 | Cases of diarrhoea .. | 11 | 6 | 1 | Nil. |
| 18 | Amœbic dysentery .. | 4 | 8 | 4 | 2 |
| 27 | Non-amœbic dysentery. | 2 | 6 | 10 | 9. |
| 23 | Sprue .. | 12 | 6 | 3 | 2 |

"He found that only a very small proportion of the bacilli falling in the groups to which the well-established pathogenic intestinal organisms belong, agglutinated with the antisera of the latter bacilli. Further study on this subject is in progress."

Kala-azar.

Dr. L. E. Napier kindly contributes the following review:—

"**Epidemiology.**—Geographical distribution:—At the beginning of the year Captain J. B. Hance reported three cases of kala-azar from Dera Ismail Khan, one case being confirmed by spleen puncture findings, in men who had never been away from the North-West Frontier Province. The observation is so far an isolated one.

"From Assam the Director of Public Health reports that a number of foci of the disease have been found in Lakimpur District, a district which was previously supposed to be free from the disease. A survey in Cachar has shown that 117 out of 737 villages surveyed are infected and the survey in Sylhet indicates that the disease is much more common there than was previously supposed.

"**Age incidence:**—Dr. S. C. Basu, analysing 1,600 cases in villages near Calcutta diagnosed clinically, showed that the frequency distribution curve has its peak at the second quinquennial period, falling almost to the base line by the eighth quinquennial period.

"Dr. Basu also described an outbreak of fever with a typhoid-like onset, occurring spontaneously in the month of May in a village in Bengal, which he concludes on clinical grounds, supported by a spleen puncture finding in one case, to be an outbreak of kala-azar.

"During the year Lieutenant-Colonel T. C. McCombie Young published a book on 'Kala-azar in Assam.' In this most important publication he gives the history of kala-azar in Assam since its introduction and the means by which the Public Health organisation of the province has dealt with it; he describes the partial success of the isolation methods and the fuller success of treatment on a large scale. Many epidemiological facts have been collected which are interesting to the general

reader and which will prove invaluable to the research worker.

"**Transmission.**—In an important paper that may throw some light on the problem of the transmission of kala-azar, Major R. Knowles, Dr. L. E. Napier and Assistant Surgeon R. O. A. Smith, I.M.D., reported that they had been able to show that flagellation of *Leishmania donovani* occurred in the gut of the sandfly, *Phlebotomus argentipes*. Out of 56 consecutively dissected laboratory-bred flies, fed three to five days previously on kala-azar patients, 25 flies showed flagellates in their fore- or mid-gut. Controls were carried out with 46 laboratory-bred flies fed on patients who were not suffering from kala-azar and 407 wild flies were dissected, all with negative results.

"**Bed-bug experiments:**—Major H. E. Shortt and S. C. Swaminath infected a mouse with *Leishmania* by injecting into its peritoneal cavity the contents of the gut of a bed-bug, *Cimex hemiptera*, which had previously fed on the peripheral blood of a kala-azar patient. In another paper they showed that the flagellate forms of *L. donovani* lived longer and with more certainty in the gut of *Cimex lectularius* than in the gut of *Cimex hemiptera*. This is an interesting observation in view of the fact that *C. hemiptera* and not *C. lectularius* is the bed-bug that is found in the endemic area in Assam. The same workers report the occasional finding of *Nosema adiei* Christophers (1922) in the salivary glands, the gut and ovaries of *C. hemiptera*; they give a few notes on the life history of this parasite.

"**Diagnosis.**—Lieutenant-Colonel F. F. Elwes, Drs. V. K. Narayana Menon and P. S. Rama Krishnan suggested that—although useful—the 'aldehyde reaction' in kala-azar was by no means a wholly reliable test and reported that in 23 per cent. of proved cases of kala-azar they had found the reaction negative, whereas a certain number of clinically suggestive cases which had given a 'negative' liver puncture gave a positive 'aldehyde reaction'; these latter cases improved on antimony treatment. In reply to this paper Dr. Napier pointed out that in the early stages of the disease the reaction was always negative, but that he had had no experience of cases other than kala-azar cases giving a really positive 'aldehyde reaction.' He suggested that liver puncture without culture was not a reliable method of diagnosis.

"Major Knowles and temporary Assistant Surgeon B. M. Das Gupta described a very valuable method of diagnosis by thick film examination of the peripheral blood and claimed 67 per cent. of positive findings in kala-azar cases. The method is also useful in the diagnosis of malaria.

"Major Shortt discussed the relative value of the various diagnostic methods and their application as criteria of cure. He made the interesting observation that occasionally a case still showing parasites in the spleen pulp would become 'sterilised' in the course of time without further treatment. Dr. Napier reported a case where this had occurred and other case in which a transient infection had become cured without any treatment whatsoever. Two similar cases were reported by Major Knowles and Das Gupta in a paper on transient leishmaniasis in animals and man.

"**Treatment.**—'Urea-stibamine':—During the year several papers were contributed on the treatment of kala-azar with this drug; Dr. P. Foster reported 20 cases from a tea garden in Assam; Major Shortt and Assistant Surgeon R. T. Sen reported 20 cases treated in Shillong; Dr. U. N. Brahmachari reported 8 'resistant' cases and 11 other cases treated in Calcutta, and finally Dr. J. Dodds Price reported 8 'resistant' cases treated at Salona. The vast superiority of this drug over the ordinary tartrates in the treatment of kala-azar is shown by all these papers; the testimony of Dr. Dodds Price with his long experience of the disease is perhaps the most valuable. He concludes his paper with the following words:—"I am of the opinion that urea-stibamine is a most valuable remedy

in the resistant type of the disease.....I have treated fifteen cases of kala-azar that had had no other form of treatment previously, but, although these cases have done well, my results have not been so striking as in the resistant type of the disease and I have had no dramatic cures after only 5 or 6 injections; the average number working out at 14.'

"Drs. Brahmachari and Das in further experiments on the chemical constitution of 'urea-stibamine' have concluded that this has to be modified, and that the compound is not the urea salt of para-amino-phenyl stibinic acid, as was originally suggested by the senior writer. They also showed that unlike 'stibamine' this compound does not undergo polymerization. The same writers, working in conjunction with Drs. S. C. Chondhury and P. B. Sen, have shown that when sodium antimony tartrate is injected intravenously 6 per cent. of the antimony is excreted by the kidneys in the first 24 hours, but when 'urea-stibamine' is used 30 to 40 per cent. is excreted in the same period; they suggest that this accounts for the low toxicity of the latter drug. They also showed that antimony could be demonstrated in the urine two months after a single dose of antimony tartrate, and that only a small quantity of antimony was excreted in the faeces. In further researches on the excretion of antimony Drs. Brahmachari and Sen have concluded that there is a maximum concentration limit in the tissues of the body which acts as a safeguard against accumulation of antimony in the body.

"Sodium and potassium antimony tartrate:—Dr. Napier in a paper on the problem of confirming a cure, attempted to lay down a rule of dosage which would be useful to workers away from laboratory conveniences. His conclusions were based on an analysis of 95 hospital treated cases whose treatment had been controlled by spleen or liver puncture and whose subsequent history had been ascertained. He concluded that 4 grammes of either sodium or potassium antimony tartrate per 100 lbs. body weight of patient was necessary to ensure a cure in all but definitely 'resistant' cases, but that this maximum dosage could be modified in certain cases; he suggested a definite rule for these modifications. He concluded that there was no definite rule that could be made for 'resistant' cases, which he suggested formed about 5 per cent. of the total cases coming for treatment.

"Dr. A. Mukerji suggested that the reactions which occasionally occur with watery solutions of sodium antimony tartrate could be avoided by the use of saline solutions of the tartrate.

"The Director of Public Health, Assam, reports that during the year 1923 no less than 35,071 cases of kala-azar were treated in the province with a death rate of 11.7 per cent., and that up to the end of August 1924, 37,112 cases had been treated as compared to 24,592 for the same period last year. He does not attribute this increase to an increase in the disease but to the greater facilities offered to the patients and to their increased willingness to take advantage of these facilities.

"At the Calcutta School of Tropical Medicine trial is being made on a large series of cases with meta-chloro-para-acetyl-amino-phenyl stibiate of sodium (von Heyden 471) and with 'Stibamine glucoside,' and at the Pasteur Institute, Shillong, a comparative trial of the above-mentioned two compounds and 'urea-stibamine' is being carried out.

"Pathology and laboratory technique.—Dr. M. N. De described a useful method of staining tissues to demonstrate the intra-cellular position of the parasites.

"A method of estimating the globulins in serum was described by Dr. C. B. Ray. He found that the increase in the globulin content of kala-azar patients' serum was due to an increase in the euglobulin fraction, which showed an increase from the normal of 7 or 8 per cent. to 40 or 50 per cent. of the total globulins. He suggested that the various serum tests for kala-azar depended on this fact.

"Captain P. Ganguli (T.C.) reported the presence of occult blood in the stools of practically every kala-azar case that he examined and he also noted that the specific gravity of the blood of kala-azar patients was always below 1,050.

"Dr. Napier reported that the hydrogen-ion concentration of the blood was very little changed in kala-azar patients, but that the power of neutralising both acid and alkali, i.e., the buffer power, was markedly reduced. He described a modified colorimetric method of estimating the pH of the blood and other coloured fluids. In another paper the same writer described a method and gave graphs for the preparation of N.N.N. medium of various concentrations of the hydrogen-ion, and in a third paper written in conjunction with Dr. P. Murugesan he reported that the pH range at which the flagellate stage of *L. donovani* could remain viable was from pH 4.75 to pH 8.38. They showed that the flagellate developed from the round form much more rapidly in medium slightly to the acid side of normal, and suggested that with this wide range of viability the flagellate might pass through the stomachs of people suffering from a slight degree of achlorhydria and of infants."

Helminthic Diseases.

Dr. Asa C. Chandler reviews the year as follows:—

"A number of valuable pieces of work in the field of helminthology have appeared; they may best be reviewed under the heads of ankylostomiasis, dracontiasis and filariasis, flukes and tapeworms, and anthelmintics.

Ankylostomiasis.—The complete report of the ankylostomiasis inquiry in Madras by Dr. K. S. Mhaskar (*Indian Med. Res. Memoirs*) is the outstanding publication of the year in this field. The report covers eight years' work in the Madras Presidency, and contains the results of much valuable survey and experimental investigation. All of the results have previously appeared in a series of 45 papers, but this incorporation into a single memoir adds greatly to their practical value. In new work published within the year, Mhaskar (*Indian J. Med. Res.*) has called attention to the rapid diminution of hookworm larvæ in night-soil. Dr. G. C. Ramsay (*Indian Med. Gaz.*) questions Dr. McVail's suggestion that the high temperature of a pig's body (104°F.) is injurious to human hookworm eggs passed through its digestive tract, and points out that viable hookworm larvæ can be obtained from febrile patients. The whole question of the significance of animals as disseminators of human helminthic infections was investigated by Dr. A. C. Chandler (*Indian Med. Gaz.*) who called attention to three methods of dissemination by animals; (1) as hosts; (2) by mechanical transfer of eggs on feet and body; and (3) by ingestion of faeces and subsequent passage of undamaged eggs. Pigs harbour a *Necator* which may be a mere hostal variety of the human species, but various attempts to infect pigs with larvæ of human origin have failed. The passage of eggs unharmed through the digestive tracts of pigs, dogs and rats was proved, viable eggs being passed in the faeces of these animals for at least 72 hours after an infective feed. The danger of allowing coprophagous animals to have access to human faeces is emphasised. Dr. L. F. Hirst (*Ceylon J. Science, Med. Section*) has discussed available methods of isolating nematode larvæ from soil, sludge and sewage, and has described a modification of the Baermann technique for isolating larvæ from gasified effluents and sludges; he also describes methods of separating infective nematode larvæ from soil nematodes by their aerial extension on soil surfaces, penetration through porous membranes into warm solutions, and their ability to penetrate the skin and reach the lung of the rat. Experiments were carried out on viability of hookworm larvæ in different types of soil which showed that in a Ceylon laboratory in the cool season larvæ could survive for four months, and in fair numbers for two months; at 37°C. they died much more rapidly. Mention should also be made of an important piece of work on mass

diagnosis of hookworm infestation by Lieutenant-Colonel Clayton Lane (*Trans. Roy. Soc. Trop. Med.*), for although no longer in India, his long and fruitful service here has given India an undying interest and sense of partisanship in his work. Lane has described a method of direct centrifugal floatation for the detection of hookworm eggs in faeces which is very ingenious, effective and very practicable if the simple though special apparatus necessary is at hand.

Dracontiasis and Filariasis.—A very thorough and highly valuable piece of work on dracontiasis has been published by Dr. N. H. Fairley and Lieutenant-Colonel W. G. Liston in a series of six parts (parts 1 to 5, *Indian Jl. Med. Res.*, part 6, *Indian Med. Gaz.*). In part I, three etiological factors in the disease are considered,—the female worm, the embryos, and secondary bacterial invaders. Evidence is adduced to show that the female worm injects a toxic substance into the subdermal tissues which results in the formation of the blister, and by absorption causes the early systemic symptoms such as urticaria, cyanosis, dyspnoea, gastro-intestinal disorders, giddiness, etc. The development of the ulcer and structural relation of the worm to it is accurately described. The only lesions produced by the embryos are subacute sterile abscesses; bacterial invaders are responsible for all septic complications. Part II deals with the effect of digestive juices on Cyclops and guinea-worm larvæ. Attempts to infect monkeys were negative. Part III contains an account of local Indian remedies, the most interesting of which are the time-honoured custom of douching and winding, and a method of extraction by suction. Part IV describes the clinical picture, including systemic toxic symptoms, the location of the ulcer (on the lower extremities in 86.5 per cent. of cases), and the blood picture. Part V discusses intravenous medication. It is pointed out that if septic complications have developed, immediate mechanical extraction is necessary whether the worm is dead or alive; without sepsis, intravenous medication which was lethal to the worms would be valuable if such a medication could be discovered. Tartar emetic is of no use. Part VI deals with the general subject of treatment, which varies according to the pathological condition and state of the ulcer, especially with respect to the presence or absence of sepsis. Previous to blister formation, rupture of the parasite is likely to be followed by urticaria erythema, etc. If the blister is present it should be aspirated aseptically in order to limit the size of the subsequent ulcer; if ruptured, the prevention of sepsis is of prime importance. If the worm is closely convoluted it is best excised *en masse*, otherwise mechanical extraction by intermittent traction and massage toward the sinus is advised, the technique is carefully described. A new operative technique is also described by which the worms can be removed in sections with excellent results; 13 of 19 cases were cured within a week. Local antiseptics and narcotic injections are of no use, and there is danger of chemical inflammation of the tissues. Adrenalin is valuable in relieving urticaria, asthma, etc., which herald the appearance of the adult worm in the subcutaneous tissues. Major R. E. Wright (*Indian Med. Gaz.*) has described a case of an encysted guinea-worm under the eyelid and upper orbital boundary in a child of 5, removed by operation; the worm was identified by Prof. Leiper at the London School of Tropical Medicine.

On the subject of filariasis very little has been published during the year. Dr. V. T. Korké (*Indian Jl. Med. Res.*) has described a new species of microfilaria from a dog, and gives a detailed description of *Spirocerca sanguinolenta* of the dog, calling attention to its generic affinities. Dr. A. C. Chandler (*Parasitology*) has described several new species of adult and embryonic filariæ from Indian birds. Human filariasis has been entirely neglected in Indian publications.

Flukes and Tapeworms.—Dr. N. H. Fairley (*Indian Med. Gaz.*) has made some experimental studies in intravenous therapy on goats artificially infected with

Schistosoma spindalis. Of 19 animals treated with tartar emetic, a complete cure was obtained in only 5; in 3 the parasitic level was reduced; and in 11 the treatment was a failure. Urea stibamine failed in all of 6 cases. Emetine hydrochloride proved to be an absolutely specific cure in all of 5 cases. The drug has a lethal action on the adults in the portal system, the worms filtering out into the portal vessels, where they set up a secondary thrombosis before their final disintegration by phagocytosis. Ova in the tissues diminish progressively, disappearing after a few months; living ova disappear rapidly. Pathological lesions disappear with the death of the worms. Mr. R. B. Lal (*Indian Med. Gaz.*) has shown that cases of *Schistosoma hamatobium* are sometimes positive to the aldehyde reaction, thus making the value of this test doubtful where schistosomiasis and kala-azar occur together. Lieutenant-Colonel Clayton Lane (*Annals Trop. Med. and Parasit.*) has discussed the morphology and systematic position of *Gastrodiscus hominis* and he concludes that the grounds for its separation into a separate genus, *Gastrodiscoides*, are untenable. Mr. G. D. Bhalerao (*Annals Trop. Med. and Parasit.*) has made a study of the trematode parasites of the food mammals of Rangoon, in which two new species were described. Dr. M. B. Soparkar (*Indian Jl. Med. Res.*) has described a new cercaria from northern India.

Prof. F. J. Meggitt (*Parasitology*) has published a valuable article on the collection and preservation of tapeworms. He has also done some interesting systematic work on cestodes, including an account of the tapeworms of the mongoose (*Parasitology*) and of pigeons in Burma (*Parasitology*), with descriptions of several new species; a description of a new tapeworm from a duck (*Annals and Magazine of Natural History*); and an account of *Ligula ranarum* in a frog in Rangoon (*Annals and Magazine of Natural History*). Meggitt has also made a contribution to the life history of a reptilian tapeworm (*Annals Trop. Med. and Parasit.*). Major F. J. W. Porter, R.A.M.C. (ret.) (*Indian Med. Gaz.*) has described a remarkable case of hydatid of the liver of 20 years' duration. The cyst was enormous and burrowed down into the pelvis between the parietal peritoneum and the abdominal parietics; the case simulated chronic tubercular ascites and peritonitis. Washing of the cavity after drainage with pure hydrogen peroxide, and later zinc ionization, effected a cure in a few weeks.

Anthelmintics.—Dr. K. S. Mhaskar (*Indian Jl. Med. Res.*) has studied the inhibiting effect of anthelmintics on the eggs of hookworms and roundworms, and found that beta-naphthol, thymol, carbon tetrachloride and santonin have a fleeting effect lasting only three days, whereas oil of chenopodium may suppress ovulation for as long as 12 days. Post-treatment examinations, therefore, should be made after a lapse of 3 or 12 days according to the anthelmintic used. Drs. J. P. Bose and A. K. Mukerji (*Indian Med. Gaz.*) investigated the effect of carbon tetrachloride on liver function in uncomplicated ankylostomiasis cases given 70 minims of CCl₄ and one oz. of saturated solution of magnesium sulphate on two consecutive days, by means of the levulose tolerance test; they found no evidence of any functional disturbance. Major R. N. Chopra and Dr. A. C. Chandler made a study of Indian santonin prepared from *Artemisia maritima*, indigenous in Kashmir, as an anthelmintic, and found that it was fully as effective in expelling *Ascaris* as the ordinary European drug; they point out that santonin is still our most effective ascaricide, though very expensive."

Leprosy.

Dr. E. Muir reviews the year as follows:—

1. "**Epidemiology.**—Incubation period. This most difficult and obscure subject has been dealt with in a masterly article by Sir Leonard Rogers.

He analyses the figures available from Hawaii and the Philippines and shows from these and other statistics

that the length of the incubation period varies with the length and closeness of contact. Under conditions of close contact, as when a child is in the arms of a strongly infectious mother or when there is direct inoculation, the period may be as short as 6 months; where infection is due to sleeping on the same bed with a leper the average period is 20 months; where the communication is not so direct, as where the person affected has lived in the same house with a leper, the average period is 3 years.

There are other factors which are not mentioned in the paper which must be of no less importance. Thus the stage of the disease of the infecting leper, and the number of bacilli in his skin and mucous membranes, and the presence of predisposing or accompanying diseases such as malaria or syphilis, must have a very marked effect on the length of the incubation period.

The length of the apparent incubation period must vary very much with the intelligence and power of observation of the patient, as in one case two small anæsthetic patches had remained constant for 22 years as the only sign of infection; a thickened great auricular nerve was also found when the patient was examined, making the diagnosis certain.

2. Communicability. The hygienic conditions under which the community lives must always be the most important factor with regard to the communication of leprosy. Filthy habits, both personal and domiciliary, promiscuity, both general and sexual, are strong determining factors. 'Sir George Newman mentions the unrestrained sexual relationships in the middle ages in England as having favoured the increase of leprosy. Even in recent times in the province of Galicia in Spain the most unusual feature of a high leprosy rate among females was attributed by Tello to their promiscuous habits during the temporary emigration of their husbands.'

In the Croonian Lectures, Sir Leonard Rogers propounds an interesting hypothesis that 'infection by mild tubercle of a large proportion of a population may render it less susceptible to the infection of leprosy, this being one factor in the extinction of leprosy as an endemic disease in Western Europe, in addition to improved hygiene and other influences.' He gives statistics to show that the incidence of leprosy is to a certain extent in inverse ratio to the incidence of tuberculosis in many countries.

3. Predisposing causes. An important factor in the incidence of leprosy has been brought forward during the year, viz., that other concurrent or predisposing diseases bear a very important part in the incidence of leprosy. The disease cannot be communicated to the lower mammals, and it appears as if it will seldom develop in man unless there is some other disease present, or some other cause to lower the resistance of the body and render it a suitable soil for the growth of the leprosy germ. Among the most important of these diseases is syphilis, a very large proportion of positive Wassermann reactions being found in leprosy. Thorough anti-syphilitic treatment renders a large proportion of these negative and in such cases the appearance of the negative Wassermann is followed by marked improvement in the leprosy symptoms.

Malaria, gastro-intestinal diseases, hookworm, and other debilitating diseases have also an important bearing on the incidence of leprosy.

Symptomatology.—The prolonged nature of leprosy has obscured the important fact that it is a self-healing disease, the course of which may be represented diagrammatically by a parabolic curve, with few bacilli and low immunity in the first stage and with many bacilli and little immunity in the second stage; during these two stages the curve is rising until finally on the descent of the curve the third stage is reached, one of increasing immunity, resolution and disappearance of lesions and bacilli, although this as a rule does not happen until deformity and crippling have been produced. The grossness of the infection as indicated by the height of

the curve above the base line is influenced by the degree of resistance to the invading organism. The less heavy the infection the more does the disease tend to be concentrated in the peripheral nerves, and the nerve (anæsthetic) type of leprosy is thus indicated by a flat curve. In the grosser skin (nodular) type the earliest and latest lesions (when the high curve is near the base line) are associated with nerve symptoms, viz., anæsthetic patches in the early stage and distal, trophic lesions in the late. A mild type of leprosy (indicated by a flat curve) may at any stage in its course be suddenly changed into a more virulent type by the lowering of resistance due to the contraction of some other disease, which would be indicated by an abrupt rise in the curve.

A curious condition found in the nerve type of leprosy is nerve abscess. These may be single or multiple; when the latter, they are generally confined to one nerve and may communicate with one another through a hollow lumen in the nerve trunk. A nodulation first occurs due to a granuloma formation; this becomes caseous and later liquid pus is formed. This pus is sterile and no acid-fast bacilli can be found in it. In the cases examined the disease was confined either to one nerve or to nerves of one limb, no trace of leprosy being found in other parts of the body. It would therefore appear as if the more severe the nerve lesion, the more is the disease limited in its extent.

Major J. Taylor and Captain Malone published an interesting paper on the complement fixation test in leprosy, using defatted tubercle bacilli as antigen. Positives were given in tubercular leprosy in 96 per cent. and in nerve and mixed cases in 92 per cent. 14 normal controls and 23 positive-Wassermann-reaction controls were all negative. Tuberculous controls gave 20 positive out of 30 cases tested.

Treatment.—1. The importance of early treatment in tuberculosis is generally recognised. In leprosy, however, a disease in which the early clinical signs are much more easily recognised than they are in tubercle, much more care has been expended on the later stages when disfigurement and disablement have started their ravages. Yet leprosy when taken early is much more amenable to treatment than is tuberculosis. The fact is that ignorance regarding the early symptoms of leprosy, fear of loss of employment, or social ostracism should the patient be known to be suffering from leprosy, and the fatalism which submits to the inevitable in a disease supposed to be incurable, all combine to keep the patient away from medical aid in the early stages. Yet there is evidence to show that almost all cases which come under treatment at the earliest stage at which they can be diagnosed clinically, and who are treated efficiently and for a sufficiently long period will lose all active signs of leprosy and will have a fair prospect of remaining free from the disease for the rest of their lives, provided they are able to maintain their general resistance at a reasonably high level. It is therefore highly important that clinics should be started to which patients can be attracted by the hope of cure and that doctors should be trained in the early signs of leprosy and the best remedies to be used.

2. The treatment of accompanying and predisposing diseases must necessarily take precedence of any special treatment that may be used. It is useless, for instance, to attempt any form of anti-leprotic treatment when a syphilitic infection co-exists, until the syphilis has first been eliminated by appropriate treatment.

3. While many forms of treatment have been tried, the various preparations of hydnocarpus and chaulmoogra oils are on the whole still the most popular. Of these the ethyl-esters are the most widely used. An improvement in the preparation of these esters has lately been adopted in Calcutta where undistilled esters prepared without boiling have been found more simple to manufacture, less painful on injection, and more efficient in action. The addition of creosote to the esters as used in Calcutta has been found in the Philippines to increase their efficiency.

Wilson of Korea has found the injection of pure chaulmoogra oil less painful and more efficient than the injection of esters. This has been confirmed in Calcutta, where as much as 12 c.c. of pure hydnoecarpus oil has been injected subcutaneously by infiltration without any complaint of pain.

Wilson also gets good results with chaulmoogra oil given orally, and Travers of Kuala Lumpur advocates the oral administration of the powdered seeds of *Hydnocarpus anthelmintica* mixed with half the quantity of *Cannabis indica* seeds.

4. Any treatment is bound to fail which neglects the ordinary life and habits of the patient. It is being more and more realised that the old type of leper asylum where admission implies utter abandonment of hope, must be abandoned. The following is an extract from a report of the Kwanju Leper Institution in Korea which is being run on more modern and humane lines:— 'In the treatment of leprosy I feel that the hygienic measures are almost as important as the administration of drugs. Patients here are given baths twice weekly and all are encouraged, even the one-legged, to work in the garden. The regular work as a form of exercise is excellent for them, and in many patients the stiff joints are soon much better and the general condition is improved. One of our lepers has been trained to care for the teeth; scaling and cleaning is done and extractions performed. We have taught our lepers various kinds of industrial work, and they lead a very active life. Our buildings are erected by them and they make all the bricks. Many are carpenters, masons, shoemakers, tinkers, etc. They produce all the vegetables used, and every room is a garden club that must prepare its own pickles and sidedishes, so this practically forces the cripples to get out and do some gardening. The spirit of the place is good. All are cheerful, games are allowed, and on the whole they are unusually happy. Some of the lepers have been trained by various members of the hospital staff so that now they do practically all the medical work required for their own cases, including the mixing of drugs, giving of injections, performance of minor operations, etc., and they are well able to use the microscope.'

Tuberculosis.

Dr. Muir writes:—

"If other diseases have slain their thousands, tuberculosis has slain its tens of thousands. If malaria be recognised as the most fatal disease in the country districts of India, tuberculosis must be given precedence as regards fatality in the towns. The *Calcutta Medical Journal* in its editorial for July, 1924, quotes from the report of the Bengal Public Health Department and the report of the Calcutta Health Officer. There are grounds for believing that tuberculosis caused 100,000 deaths in Bengal during the year and that there were 2,216 deaths or 2.4 per thousand in Calcutta. The incidence of deaths from this disease varied in different wards, giving 5.4 per thousand in ward 20 and only a little over 0.2 per thousand in ward 3. It varied in different communities, being 3.2 among Mohammedans and only 2.2 among Hindus. It varied according to sex, 6 females dying for every male between the ages of 15 and 35.

The fact that bovine tuberculosis is not found in India does not mean that there is not a danger of this disease appearing in the future if due precautions are not taken. Its absence is mainly due to two causes, viz., the low breeding of the cattle and the open-air life, which most Indian cattle lead. It has been shown that the usual type of Indian cattle is not susceptible to bovine tuberculosis and that most cases of tuberculosis in Indian cattle are due to the human type. The late epidemic of bovine tuberculosis at the Bombay Zoological Gardens reported upon by Lieutenant-Colonel W. Glen Liston and Dr. Soparkar, where four spotted deer and a gazelle were found to be suffering from tuberculosis with characters of a bovine type, and an antelope, a spotted

deer and a llama gave cultures having many of the characteristics of bovine tuberculosis, shows that there is a distinct danger of infecting cattle in India through imported cattle. As breeding of cattle proceeds in India the danger of bovine tuberculosis becoming endemic in India is bound to increase and only careful prophylactic measures will insure its prevention. The epidemic in the Bombay Zoological Gardens is supposed to have been due to three llamas imported from Germany and it was only stopped by the slaughter of all suspected animals and other strict preventive measures.

Lieutenant-Colonel R. Row has prepared an antigen by subjecting tubercle bacilli to autolysis and then extracting with petroleum ether. He finds three layers, the topmost containing the lipid material which causes the acid-fastness in solution; the second, in the form of a soft, whitish cake is made up of agglutinated tubercle bacilli which have to a large extent lost their acid-fastness; the lowest layer consists of saline in which the autolysis had taken place. The upper layer produced no positive complement fixation and produced very severe local reactions both in guinea-pigs and in man. The second layer was feebly antigenic in complement fixation; guinea-pigs stood 5 mgm. subcutaneously and rabbits 2 mgms. intravenously; the treated guinea-pigs showed definite immunity when injected with virulent tubercle bacilli. This layer also showed distinct curative value in a controlled guinea-pig experiment, and in man it was distinctly beneficial both in glandular and pulmonary cases.

'It is an ill wind that blows nobody good,' and even tuberculosis seems to have its value. Sir Leonard Rogers in his Croonian lectures shows that there is a possibility that a widely spread light tubercular infection of the community such as exists in most Indian cities has a tendency to produce immunity to leprosy. It may be that tuberculosis as it spreads to the villages will help to stamp out the more dreaded though less fatal disease.

Though tuberculosis is certainly one of the four most fatal diseases of India, very little research work is being done in connection with it in this country as compared with many other less serious diseases. This is probably due to the feeling that so much research is being done in connection with tuberculosis in other countries. One line of investigation, however, might be profitably taken up, viz., the statistical survey of the disease in India. While the incidence of tuberculosis is steadily diminishing in European countries, there seems to be little doubt that it is increasing in India. Although some work has already been done along these lines, there is urgent need for further investigation."

Relapsing Fever.

The recrudescence of relapsing fever in Madras Presidency is arousing considerable attention, and Major A. J. H. Russell, A. Ayyar and Captain Ubhaya (T.C.) contribute a study of the present situation. Norman Cheevers refers to a terrible epidemic fever which swept the Madras Presidency in 1824 and caused over 100,000 deaths, and which was possibly relapsing fever. Subsequent to that date, however, the disease appears to have disappeared locally, although Mysore State is suspected by the authors to have constituted a carry-over centre. Its recrudescence first drew attention in the Salem District in October, 1921. In 1922 it was epidemic in Tanjore, Trichingopoly and in Mysore. In 1923 it became fairly widespread throughout the Presidency, being chiefly confined to the rural areas, and to the *Pallans* and *Paraiyas*, the lowest of castes, living in mud huts. With regard to symptomatology of the disease, the authors note the existence of invariable jaundice, great and typhoid-like prostration, severe diarrhoea, and in convalescence marked alopecia, persistent jaundice, great emaciation, oedema of the feet and ankles, and above all susceptibility to attacks of intercurrent disease. The general death rate was 37 per cent., but in some villages as high as 66 per cent. As

regards age the incidence was chiefly in adults of 20 to 40 years, and females were more attacked than males—in contradistinction to what happens in the Punjab. The louse is incriminated on all grounds as the almost certain carrier. Dr. Turkhud reports that Assistant Surgeon K. V. Krishnan, in charge of an epidemiciological unit, has worked on the disease in Ootacamund for nearly a year; serological and immunological studies have been undertaken to cover the several phases of the disease in experimentally infected animals, and a prophylactic vaccine is being prepared. It is hoped to carry these investigations forward and to publish their results in due course.

Major J. A. Sinton records the successful cultivation of the causal spirochæte in a modified Wright's tube, as first used by him for the cultivation of malarial parasites. The media used were either hydrocele fluid or horse serum, to each 100 c.c. of which $1\frac{1}{2}$ c.c. of 50 per cent. dextrose were added. Some of the cultures were still full of active spirochætes after six weeks.

K. V. Raju records an outbreak in October 1923 on the M. and S. M. Railway at Hubli. Male adults of low caste were chiefly affected. High fever, pains in the bones and joints, a staggering gait, and jaundice of more or less marked degree are the chief symptoms noted. Treatment with novarsenobillon was very successful.

B. K. Mehta records an interesting case of rat-bite fever, probably contracted in Bombay, with a typical temperature chart, successfully treated with sulfarsenol.

Diabetes.

The history of the work on insulin during 1924 is exceedingly instructive. In January, Major J. Taylor and Dr. A. R. J. Douglas published a paper on the (apparent) deterioration of insulin in India under tropical conditions of climate. With insulin locally purchased in Rangoon they obtained but a slight reduction in the blood sugar of rabbits with a dose of 10 supposed units, and none at all with 25 units from a second phial. A second sample was purchased from Calcutta, and of this 25 units proved to be scarcely potent at all. It was concluded that transit or storage under tropical climatic conditions might destroy the potency of insulin. In the same month, Major T. A. Hughes stated that a sample received direct from London in August 1923, and tested in October, supposed to be of strength 20 units, only shewed 3 units.

This was followed in February by a letter from the British Drug Houses stating that their "A. B." brand of insulin remained still fully potent when heated to 95°C. for one month, and that rabbits who shewed a blood sugar content of 0.21 per cent. were quite unsuitable for test. As a precaution, however, they were now sending their insulin out to India in cold storage. Messrs. Burroughs and Wellcome also drew attention to the fact that their insulin was prepared by the picro process, a process which according to Professor MacLeod enables the insulin to withstand boiling without losing potency.

In March, Major H. Stott at Lucknow reported on 12 cases of diabetes treated for six months with freshly imported insulin, approximately 2,000 units having been used in all. Urinary sugar tests appeared to indicate that within 8 months, including an Indian hot weather, samples had deteriorated from $1\frac{1}{12}$ ths to $1\frac{1}{12}$ ths of their original potency; and were only some $3\frac{1}{40}$ ths of the original standard; this being confirmed by Major Taylor on experimental tests of the same samples on rabbits. Dr. J. P. Bose (Diabetes Research Scholar at the Calcutta School of Tropical Medicine), tested "A. B." brand insulin and reported that "it retained at least $1\frac{1}{4}$ th of its original potency," and found that the same results held good whether the insulin was imported in cold storage or not. Burroughs, Wellcome insulin yielded somewhat similar results. Major Taylor in the meantime tested insulin sent out direct from London

to Rangoon in cold storage and found it to be fully potent, but was puzzled about the curious irregularities which occurred among his experimental rabbits. He concluded that rabbits whose blood sugar exceeded 0.12 per cent. should not be used, and they must be starved for 24 hours before testing. The British Drug Houses meantime examined a half-empty phial, reported defective by Dr. Bose, and returned from Calcutta to London, and found it fully active, although it had been exposed to tropical conditions for $2\frac{1}{2}$ months. Either, Dr. Bose concluded, the rabbit test is unsuitable under Indian conditions, or there must be some factor—not necessarily heat—present under tropical conditions which causes deterioration. At this stage, in an editorial note, we advised importation and keeping of insulin in cold storage. Fortunately the Indian Research Fund Association now took up the problem.

In May, Major T. A. Hughes reported that a sample of "A. B." insulin, bought in November 1923, and tested in January 1924, kept in cold storage, was fully potent on testing on rabbits. In July, Major Acton and Dr. Bose drew attention to the extraordinary differences in response to insulin given by rabbits of different colours. Given the same dose of insulin, albino rabbits might be almost unaffected, whereas black and white piebald rabbits got hypoglycæmia and convulsions. Small doses of adrenalin counteract the effect of insulin by causing hyperglycæmia, and even such factors as fright and exercise might affect the adrenalin content in rabbits. Colour variation and response is closely correlated with the adrenalin content of the animal.

Finally in our issue for last December, Major Taylor shews that the only permissible method of testing insulin under tropical conditions is to adopt MacLeod and Orr's standard method of test. Rabbits are selected whose blood sugar does not exceed 0.12 per cent., and are starved for 24 hours. A large batch is then injected with 0.75 to 0.125 c.c. of the insulin sample, and results are assessed in terms of insulin units, according to MacLeod and Orr's standards, any rabbit which departs markedly from the mean being discarded. The result is to give a standard assay, and under such conditions one insulin sample in tablet form and two in solution have proved to be of full potency; "although there is a variation in the response of Indian rabbits of mixed breeds, the average result from a series can be relied upon."

S. C. Sen Gupta draws attention to the relationship of diabetes to life insurance of Bengali subjects. All such cases are not unacceptable, and the glucose tolerance test is of value in selecting suitable cases for insurance; some other cases may perhaps be accepted at an extra premium. There is considerable need for further investigation on the subject.

Dr. J. P. Bose gives an account of a case of renal glycosuria in an Anglo-Indian female, 42 years of age. Her two brothers both shewed traces of sugar in the urine. The disease is usually hereditary and familial and is perfectly harmless, being due to the fact that the renal threshold for sugar excretion is lowered. It can only be differentiated from true diabetes mellitus by the glucose tolerance test. Such cases should be left alone.

"Deficiency" Diseases: Beriberi, Epidemic Dropsy.

The trend of recent work is to regard such diseases as food intoxication diseases, rather than as diseases due to deficiency of vitamins. Lieutenant-Colonel J. W. D. Megaw and Dr. S. P. Bhattacharjee contribute a study of a Calcutta outbreak of epidemic dropsy in 1923, in which lady medical students at the Campbell Medical School were chiefly affected. 70 cases are recorded and analysed; the chief symptoms being slight intermittent fever, the knee-jerks variable, no cardiac dilatation, and a distinctly raised blood pressure. A study of the diets concerned shewed no appreciable deficiency of any particular vitamin or other essential element; the distribution of the cases with reference to the rice

Wilson of Korea has found the injection of pure chaulmoogra oil less painful and more efficient than the injection of esters. This has been confirmed in Calcutta, where as much as 12 c.c. of pure hydnocarpus oil has been injected subcutaneously by infiltration without any complaint of pain.

Wilson also gets good results with chaulmoogra oil given orally, and Travers of Kuala Lumpur advocates the oral administration of the powdered seeds of *Hydnocarpus anthelmintica* mixed with half the quantity of *Cannabis indica* seeds.

4. Any treatment is bound to fail which neglects the ordinary life and habits of the patient. It is being more and more realised that the old type of leper asylum where admission implies utter abandonment of hope, must be abandoned. The following is an extract from a report of the Kwanju Leper Institution in Korea which is being run on more modern and humane lines:— 'In the treatment of leprosy I feel that the hygienic measures are almost as important as the administration of drugs. Patients here are given baths twice weekly and all are encouraged, even the one-legged, to work in the garden. The regular work as a form of exercise is excellent for them, and in many patients the stiff joints are soon much better and the general condition is improved. One of our lepers has been trained to care for the teeth; scaling and cleaning is done and extractions performed. We have taught our lepers various kinds of industrial work, and they lead a very active life. Our buildings are erected by them and they make all the bricks. Many are carpenters, masons, shoemakers, tinkers, etc. They produce all the vegetables used, and every room is a garden club that must prepare its own pickles and sidedishes, so this practically forces the cripples to get out and do some gardening. The spirit of the place is good. All are cheerful, games are allowed, and on the whole they are unusually happy. Some of the lepers have been trained by various members of the hospital staff so that now they do practically all the medical work required for their own cases, including the mixing of drugs, giving of injections, performance of minor operations, etc., and they are well able to use the microscope.'

Tuberculosis.

Dr. Muir writes:—

"If other diseases have slain their thousands, tuberculosis has slain its tens of thousands. If malaria be recognised as the most fatal disease in the country districts of India, tuberculosis must be given precedence as regards fatality in the towns. The *Calcutta Medical Journal* in its editorial for July, 1924, quotes from the report of the Bengal Public Health Department and the report of the Calcutta Health Officer. There are grounds for believing that tuberculosis caused 100,000 deaths in Bengal during the year and that there were 2,216 deaths or 2.4 per thousand in Calcutta. The incidence of deaths from this disease varied in different wards, giving 5.4 per thousand in ward 20 and only a little over 0.2 per thousand in ward 3. It varied in different communities, being 3.2 among Mohammedans and only 2.2 among Hindus. It varied according to sex, 6 females dying for every male between the ages of 15 and 35.

The fact that bovine tuberculosis is not found in India does not mean that there is not a danger of this disease appearing in the future if due precautions are not taken. Its absence is mainly due to two causes, viz., the low breeding of the cattle and the open-air life, which most Indian cattle lead. It has been shown that the usual type of Indian cattle is not susceptible to bovine tuberculosis and that most cases of tuberculosis in Indian cattle are due to the human type. The late epidemic of bovine tuberculosis at the Bombay Zoological Gardens reported upon by Lieutenant-Colonel W. Glen Liston and Dr. Soparkar, where four spotted deer and a gazelle were found to be suffering from tuberculosis with characters of a bovine type, and an antelope, a spotted

deer and a llama gave cultures having many of the characteristics of bovine tuberculosis, shows that there is a distinct danger of infecting cattle in India through imported cattle. As breeding of cattle proceeds in India the danger of bovine tuberculosis becoming endemic in India is bound to increase and only careful prophylactic measures will insure its prevention. The epidemic in the Bombay Zoological Gardens is supposed to have been due to three llamas imported from Germany and it was only stopped by the slaughter of all suspected animals and other strict preventive measures.

Lieutenant-Colonel R. Row has prepared an antigen by subjecting tubercle bacilli to autolysis and then extracting with petroleum ether. He finds three layers, the topmost containing the lipid material which causes the acid-fastness in solution; the second, in the form of a soft, whitish cake is made up of agglutinated tubercle bacilli which have to a large extent lost their acid-fastness; the lowest layer consists of saline in which the autolysis had taken place. The upper layer produced no positive complement fixation and produced very severe local reactions both in guinea-pigs and in man. The second layer was feebly antigenic in complement fixation; guinea-pigs stood 5 mgm. subcutaneously and rabbits 2 mgms. intravenously; the treated guinea-pigs showed definite immunity when injected with virulent tubercle bacilli. This layer also showed distinct curative value in a controlled guinea-pig experiment, and in man it was distinctly beneficial both in glandular and pulmonary cases.

'It is an ill wind that blows nobody good,' and even tuberculosis seems to have its value. Sir Leonard Rogers in his Croonian lectures shows that there is a possibility that a widely spread light tubercular infection of the community such as exists in most Indian cities has a tendency to produce immunity to leprosy. It may be that tuberculosis as it spreads to the villages will help to stamp out the more dreaded though less fatal disease.

Though tuberculosis is certainly one of the four most fatal diseases of India, very little research work is being done in connection with it in this country as compared with many other less serious diseases. This is probably due to the feeling that so much research is being done in connection with tuberculosis in other countries. One line of investigation, however, might be profitably taken up, viz., the statistical survey of the disease in India. While the incidence of tuberculosis is steadily diminishing in European countries, there seems to be little doubt that it is increasing in India. Although some work has already been done along these lines, there is urgent need for further investigation."

Relapsing Fever.

The recrudescence of relapsing fever in Madras Presidency is arousing considerable attention, and Major A. J. H. Russell, A. Ayyar and Captain Ubhaya (T.C.) contribute a study of the present situation. Norman Cheevers refers to a terrible epidemic fever which swept the Madras Presidency in 1824 and caused over 100,000 deaths, and which was possibly relapsing fever. Subsequent to that date, however, the disease appears to have disappeared locally, although Mysore State is suspected by the authors to have constituted a carry-over centre. Its recrudescence first drew attention in the Salem District in October, 1921. In 1922 it was epidemic in Tanjore, Trichinopoly and in Mysore. In 1923 it became fairly widespread throughout the Presidency, being chiefly confined to the rural areas, and to the *Pallans* and *Paraiyas*, the lowest of castes, living in mud huts. With regard to symptomatology of the disease, the authors note the existence of invariable jaundice, great and typhoid-like prostration, severe diarrhoea, and in convalescence marked alopecia, persistent jaundice, great emaciation, cedema of the feet and ankles, and above all susceptibility to attacks of intercurrent disease. The general death rate was 37 per cent., but in some villages as high as 66 per cent. As

regards age the incidence was chiefly in adults of 20 to 40 years, and females were more attacked than males—in contradistinction to what happens in the Punjab. The louse is incriminated on all grounds as the almost certain carrier. Dr. Turkhud reports that Assistant Surgeon K. V. Krishnan, in charge of an epidemiological unit, has worked on the disease in Ootacamund for nearly a year; serological and immunological studies have been undertaken to cover the several phases of the disease in experimentally infected animals, and a prophylactic vaccine is being prepared. It is hoped to carry these investigations forward and to publish their results in due course.

Major J. A. Sinton records the successful cultivation of the causal spirochete in a modified Wright's tube, as first used by him for the cultivation of malarial parasites. The media used were either hydrocele fluid or horse serum, to each 100 c.c. of which $1\frac{1}{2}$ c.c. of 50 per cent. dextrose were added. Some of the cultures were still full of active spirochetes after six weeks.

K. V. Raju records an outbreak in October 1923 on the M. and S. M. Railway at Hubli. Male adults of low caste were chiefly affected. High fever, pains in the bones and joints, a staggering gait, and jaundice of more or less marked degree are the chief symptoms noted. Treatment with novarsenobillon was very successful.

B. K. Mehta records an interesting case of rat-bite fever, probably contracted in Bombay, with a typical temperature chart, successfully treated with sulfarsenol.

Diabetes.

The history of the work on insulin during 1924 is exceedingly instructive. In January, Major J. Taylor and Dr. A. R. J. Douglas published a paper on the (apparent) deterioration of insulin in India under tropical conditions of climate. With insulin locally purchased in Rangoon they obtained but a slight reduction in the blood sugar of rabbits with a dose of 10 supposed units, and none at all with 25 units from a second phial. A second sample was purchased from Calcutta, and of this 25 units proved to be scarcely potent at all. It was concluded that transit or storage under tropical climatic conditions might destroy the potency of insulin. In the same month, Major T. A. Hughes stated that a sample received direct from London in August 1923, and tested in October, supposed to be of strength 20 units, only shewed 3 units.

This was followed in February by a letter from the British Drug Houses stating that their "A. B." brand of insulin remained still fully potent when heated to 95°C. for one month, and that rabbits who shewed a blood sugar content of 0.21 per cent. were quite unsuitable for test. As a precaution, however, they were now sending their insulin out to India in cold storage. Messrs. Burroughs and Wellcome also drew attention to the fact that their insulin was prepared by the picrate process, a process which according to Professor MacLeod enables the insulin to withstand boiling without losing potency.

In March, Major H. Stott at Lucknow reported on 12 cases of diabetes treated for six months with freshly imported insulin, approximately 2,000 units having been used in all. Urinary sugar tests appeared to indicate that within 8 months, including an Indian hot weather, samples had deteriorated from 12/12ths to 1/12th of their original potency; and were only some 3/40ths of the original standard; this being confirmed by Major Taylor on experimental tests of the same samples on rabbits. Dr. J. P. Bose (Diabetes Research Scholar at the Calcutta School of Tropical Medicine), tested "A. B." brand insulin and reported that "it retained at least 1/4th of its original potency," and found that the same results held good whether the insulin was imported in cold storage or not. Burroughs, Wellcome insulin yielded somewhat similar results. Major Taylor in the meantime tested insulin sent out direct from London

to Rangoon in cold storage and found it to be fully potent, but was puzzled about the curious irregularities which occurred among his experimental rabbits. He concluded that rabbits whose blood sugar exceeded 0.12 per cent. should not be used, and they must be starved for 24 hours before testing. The British Drug Houses meantime examined a half-empty phial, reported defective by Dr. Bose, and returned from Calcutta to London, and found it fully active, although it had been exposed to tropical conditions for 2½ months. Either, Dr. Bose concluded, the rabbit test is unsuitable under Indian conditions, or there must be some factor—not necessarily heat—present under tropical conditions which causes deterioration. At this stage, in an editorial note, we advised importation and keeping of insulin in cold storage. Fortunately the Indian Research Fund Association now took up the problem.

In May, Major T. A. Hughes reported that a sample of "A. B." insulin, bought in November 1923, and tested in January 1924, kept in cold storage, was fully potent on testing on rabbits. In July, Major Acton and Dr. Bose drew attention to the extraordinary differences in response to insulin given by rabbits of different colours. Given the same dose of insulin, albino rabbits might be almost unaffected, whereas black and white piebald rabbits got hypoglycæmia and convulsions. Small doses of adrenalin counteract the effect of insulin by causing hyperglycæmia, and even such factors as fright and exercise might affect the adrenalin content in rabbits. Colour variation and response is closely correlated with the adrenalin content of the animal.

Finally in our issue for last December, Major Taylor shews that the only permissible method of testing insulin under tropical conditions is to adopt MacLeod and Orr's standard method of test. Rabbits are selected whose blood sugar does not exceed 0.12 per cent., and are starved for 24 hours. A large batch is then injected with 0.75 to 0.125 c.c. of the insulin sample, and results are assessed in terms of insulin units, according to MacLeod and Orr's standards, any rabbit which departs markedly from the mean being discarded. The result is to give a standard assay, and under such conditions one insulin sample in tablet form and two in solution have proved to be of full potency; "although there is a variation in the response of Indian rabbits of mixed breeds, the average result from a series can be relied upon."

S. C. Sen Gupta draws attention to the relationship of diabetes to life insurance of Bengali subjects. All such cases are not unacceptable, and the glucose tolerance test is of value in selecting suitable cases for insurance; some other cases may perhaps be accepted at an extra premium. There is considerable need for further investigation on the subject.

Dr. J. P. Bose gives an account of a case of renal glycosuria in an Anglo-Indian female, 42 years of age. Her two brothers both shewed traces of sugar in the urine. The disease is usually hereditary and familial and is perfectly harmless, being due to the fact that the renal threshold for sugar excretion is lowered. It can only be differentiated from true diabetes mellitus by the glucose tolerance test. Such cases should be left alone.

"Deficiency" Diseases: Beriberi, Epidemic Dropsy.

The trend of recent work is to regard such diseases as food intoxication diseases, rather than as diseases due to deficiency of vitamins. Lieutenant-Colonel J. W. D. Megaw and Dr. S. P. Bhattacharjee contribute a study of a Calcutta outbreak of epidemic dropsy in 1923, in which lady medical students at the Campbell Medical School were chiefly affected. 70 cases are recorded and analysed; the chief symptoms being slight inter-tation, and a distinctly raised blood pressure. A study of the diets concerned shewed no appreciable deficiency of any particular vitamin or other essential element; the distribution of the cases with reference to the rice

dealers suggested food intoxication through diseased rice. S. L. Sarkar and S. K. Bamerji record a similar outbreak in Atrasia village in the Malda district; 3 families out of 13 living in the villages were affected, all of them of Mahomedan illiterate cultivator caste, whilst 4 consecutive houses in the village were infected. The habit of chewing raw rice is incriminated as a possible cause; 6 cases occurred in one household which used to buy their rice supply two maunds at a time, an 8 to 9 days' supply, whilst 2 further cases occurred in the next house among children who used to eat rice from the first house.

With regard to beriberi Dr. C. E. Cobb shews how rice control may stamp out the disease. In Malaya early in 1919 there was a shortage in rice supplies, and in July of that year Government took over control of the rice supplies in order to prevent profiteering. As a result the diet of the Chinese coolies became more mixed, the rice ration was reduced by a half, its place being taken by vegetables and sweet potatoes, and beriberi practically disappeared. The rice now eaten was of an inferior quality and but slightly milled. In 1921 Government control of the rice market ceased and beriberi has again become prevalent. It is suggested that the Chinese coolies should be encouraged to adopt a more mixed diet. Professor W. BurrIDGE analyses the causes of œdema, of which he recognises two varieties:— (a) the œdema of pressure, due to filtration lag, where the limb does not suffer any diminution of function; and (b) the œdema of function, where the fatigued muscles have a higher osmotic pressure than normal and take up more fluid than normal; it is this œdema which is probably concerned in the œdema of beriberi and peripheral neuritis type.

Lieutenant-Colonel R. McCarrison reviews the relationship of rice to beriberi in a paper read before the Royal Society of Medicine (Tropical Diseases' Section). Beriberi is prevalent on the east coast of India, but absent from the west coast, yet parboiled and milled rice is eaten equally on both sides of India. Presumably, therefore, there are other factors in the ætiology of beriberi in addition to a diet of decorticated rice. The spread of beriberi has not kept pace with the extension of rice mills. Endemic beriberi has prevailed in Madras Presidency for at least a century and occurs among eaters of house-pounded rice, and among Pariahs who live on a mixed diet. The polyneuritis produced in pigeons by an exclusive diet of polished rice differs from beriberi of man. Colonel McCarrison has produced no less than four beriberi-like diseases in pigeons by feeding on a rice diet: (a) infective polyneuritis, due to infection, but favoured in its genesis by vitamin deficiency; (b) polyneuritis due to vitamin deficiency alone; (c) polyneuritis due to vitamin deficiency, but precipitated in its onset by various infections; (d) a malady resembling true beriberi, but due to an unknown agent acting in association with an insufficient supply of vitamins. In conclusion, there appears to be some association between beriberi and site or local infection.

The same author has also investigated the relationship of manure to the nutritive and vitamin value of certain grains. The problems concerned are very complex; but natural manures in general improve the vitamin and nutritive value of the grain more than do artificial manures. "Farmyard manure does something which artificial manures do not" and it would seem that part of this "something" is to increase both the nutritive and vitamin B value of the grain grown on soils fertilized by it.

Lieutenant-Colonel R. McCarrison also continues and concludes his studies of amino-acids. The injection of certain amino-acids tends to retard growth, especially that of tryptophane, whereas histidine tends to first retard and then enhance growth, and also hastens the metamorphosis of tadpoles. All the amino-acids studied, except tryptophane, cause reduction in the size of the thyroid, whereas tryptophane causes increase in this gland; all however cause reduction in the number of

thyroid vesicles. Long continued injections of tyramine and histidine cause retarded growth, reduction in the size of the thymus, and in the size or weight of the thyroid, pancreas, lungs and kidneys, together with a fall in the respiration rate for the first 35 days of administration. Tyramine causes a marked reduction in the size of the spleen, but histamine does not; histamine causes a marked reduction in the size of the heart, tyramine does not.

Colonel McCarrison's researches have been financed by the Indian Research Fund Association. In addition to his work on beriberi and goitre, he has studied the effects of certain amines and amino-acids on the animal organism, and of excess of calcium, iodine, proteins and sugar on the thyroid gland.

A. Swarup reports three interesting cases of poisoning by infected wheat. The symptoms shewn were vomiting, giddiness, weakness and a drowsy drunken stupor. The three patients concerned were an Indian doctor and two of his servants who had all partaken of the same wheat early in November within 3 days of one another. The flour made from the wheat was suspected and is at present under examination at the Calcutta School of Tropical Medicine.

Pneumonia.

Very interesting work has been carried out by Captain R. H. Malone on the types of pneumococcus prevalent in India. Lieutenant-Colonel F. P. Mackie reports as follows:—

"Five papers were published during the year in connection with an enquiry into pneumonia amongst Indian troops on the North-West Frontier. Two of them dealt with the solubility of the pneumococcus in bile and bile salt. The factors concerned in Neufeld's test were examined and the degree of solubility of pneumococci from various sources was estimated. It was found that pneumococci vary considerably in degree of solubility in 10 per cent. sodium taurocholate solution; that pathogenic strains and members of the fixed types I, II and III tend to be soluble, while strains from normal throats and of the type IV may be soluble or insoluble. Only 10 per cent. of the strains examined were partially soluble. The degree of solubility can be definitely expressed by comparison with a set of standard opacity tubes.

An examination of the types of pneumococcus prevalent in the Punjab and North-West Frontier showed the following distribution:—

| | Per cent. |
|------------------|-----------|
| Type I | 28 |
| Type II | 22 |
| Type III | 10 |
| Type IV | 40 |

Among the type IV strains, one fairly large sub-group constituted 25 per cent. of the 106 strains tested in all, and a second 9 per cent. of the total.

Similar work has been carried on at Guindy by Lieutenant-Colonel J. Cunningham, Major J. Cruickshank and Assistant Surgeon Ramakrishnan. 29 strains isolated from cases of lobar pneumonia were studied; and it was found that, with the exception of type I, the proportion of which is considerably higher, the other three types in Madras approximate to the figures given by Malone. None of the bile-insoluble cocci reacted with any of the type sera obtained from the New York State Health Department.

Finally Captain Malone prepared a vaccine of the types of pneumococci especially prevalent in the N. W. Frontier Province, and tested its value in the treatment of 66 cases. To be of value, he claims, the vaccine must be given early. He suggests that vaccine prepared from the peritoneal fluid of rabbits inoculated intraperitoneally with the sputum of lobar pneumonia cases may be better than that from cultures on artificial media. His figures are analysed by Major H. H. King, who concludes that the vaccine is effective in promoting

recovery, lessening the duration of the fever, and assisting the onset of crisis. It is useless after the 3rd day. Preparations have been made to treat cases of pneumonia in military hospitals throughout India this winter with a standard vaccine, and Major King's paper reviewing the recent work on lobar pneumonia was published in our December number to be of assistance to officers engaged upon this investigation. In pathological matters, indeed, recent years have seen an enormous improvement in military quarters, and progress is the order of the day. Lobar pneumonia is so important a disease in India that any agent of proved therapeutic value in the disease would be very welcome.

Asthma.

Dr. A. R. J. Douglas reports an interesting case of a young married woman so sensitive to horse emanation that she was compelled to give up riding. She was treated by desensitization by intradermal injections of horse serum, in doses rising from 0.01 to 1 c.c. and finally by intravenous injections. The treatment effected a complete cure, the patient being able to ride regularly without discomfort. Sensitization tests are now part and parcel of the daily routine in Major Acton's laboratory.

Typhus.

Two outbreaks of louse-borne typhus are recorded. The first, recorded by Major E. S. Phipson, occurred in Simla, 13 cases in all with the Weil Felix reaction strongly positive in the 12 cases examined, in 2 after convalescence, and as late as the 72nd day. He comments on the great value of the reaction in establishing the diagnosis, even after the patient has recovered. The second outbreak, recorded by Lieutenant-Colonel J. Cunningham and Assistant Surgeon J. H. Theodore, I.M.D., occurred in February-March among the Assam Rifles, when engaged in the Pindari operations in the Agency tracts of Madras,—8 cases with the Weil Felix reaction strongly positive in the 3 cases tested. The infection had previously been unknown in this territory, and was clearly imported from Assam. It is not known whether it has spread among the civil population, but no cases have been reported up to the present.

Lieutenant-Colonel J. W. D. Megaw discusses the typhus group of fevers, with special reference to Bhumi Tal fever, and McKeechie's study of it in 1923. He also records having personally contracted typhus after a bite from a tick, and records that Lieutenant-Colonel Chapman reports 3 further suspicious cases of tick-typhus in the Central Provinces. The author would divide up the group provisionally into louse-typhus, tick-typhus and mite-typhus until further knowledge of the methods of transmission is obtained. It is suggested that tick-typhus should be looked for in India.

Major-General Sir Patrick Hehir, I.M.S. (retd.), contributes a classical study of louse-typhus in Greek refugees, already reviewed in our columns. U. P. Basu describes 15 cases of suspected typhus in children between November 1922 and January 1923 in Calcutta; in 1 out of 3 where the Weil Felix reaction was tested it was positive at 1 in 30 dilution. The diagnosis seems a little doubtful. Captain A. F. W. da Costa describes 4 doubtful cases of spotted fever at Nagpur in July to November 1923, three of them being in the same family, and the Weil Felix reaction positive in the 3rd case at 1 in 25 dilution.

It is quite clear that our knowledge of typhus in India is still but fragmentary, and further information is badly wanted.

Small-pox.

There is but little to report, although the reports of different Directors of Public Health indicate that in some provinces, with slackening of legislation with regard to vaccination, small-pox is becoming an increasing menace. B. K. Mukerji describes a case of alarm; while Dr. J. E. L. Chinal is an advocate of

confection of sulphur internally, as sulphur is excreted through the skin, with or without the simultaneous administration of cream of tartar, and the external application of iodine and potassium permanganate.

Snake-Bite.

Jemadar C. Singh, I.M.D., reports a striking case of Echis bite. The patient, a male adult Pathan, was treated with hypertonic saline intravenously and his condition remained critical for 48 hours. Locally an incision was made and permanganate crystals rubbed in. Adrenalin and pituitrin were given hypodermically. The patient, after having received a lethal or almost lethal dose, recovered under careful treatment. Dr. S. L. McElderry complains of the necrosis and cellulitis following the hypodermic injection of gold chloride, and Major Clive Newcomb records an interesting case where a snake charmer offered for sale an "absolutely specific cure." One of his audience was so impressed that he permitted himself to be bitten by a cobra, and died in spite of the use of this and other remedies.

The Rev. Father J. F. Caius has continued his studies on antivenene. In conjunction with the Rev. Father A. Steichen, he has attempted to concentrate this serum. The percentage of water in normal serum was found to be greater than that in antivenene, but there is no correlation between the age of a serum and its concentration. The greater its age, the higher is its refractive index. From standards of refractivity it is not possible to distinguish between normal horse serum and antivenene, and the question as to whether the antivenomous principle has a real existence as a definite substance remains unanswered. Father Caius, Captain K. R. K. Iyengar and Major L. A. P. Anderson have also tried to concentrate anti-cobra serum. The antivenomous principle apparently exists in the serum partly free and partly associated with the globulin fraction. The potency of the serum is proportional to the amount of free antivenene in unit volume, and dilution increases the potency of the serum up to a certain limit. Increase of potency, however, is limited in one direction by the formation of an insoluble antivenene-globulin aggregate, and in the other by the dilution of the free antivenene.

Dengue.

Dengue appears to have been far less prevalent in India in 1924 than in 1923, and also to have been of a much milder type. A determined effort was made by Major Knowles and temporary Assistant Surgeon B. M. Das Gupta to incriminate a *Leptospira* as the causative agent of dengue, but ended in complete failure. *Leptospira*-like artefacts were repeatedly encountered in the blood of cases, cultures and inoculated animals, but nothing resembling a true spirochæte was seen. It is suggested that the *Leptospira* described in dengue by several different workers are of the nature of artefacts or that the cases in which the *Leptospira* were found were of another disease. An experimental trial at transmission by *Culex* mosquitoes failed.

Goitre.

In a lecture to the Ryde branch of the British Medical Association, Lieutenant-Colonel R. McCarrison sums up his well-known work on this disease. There are two main factors on which the prevention and cure of goitre depend: (a) the general hygiene of the individual, and especially of his intestinal tract; and (b) the amount of iodine available for the needs of the thyroid gland and of the organism generally. . . . In one case the hygiene of the bowel may be normal, but the intake of iodine in food and water be insufficient; this appears to be the case in sheep and other animals in certain parts of British Columbia. In a second the intake of iodine may be sufficient, but the state of the intestine is such that the available iodine or other constituent of thyroxin may not be made use of; this appears to be the case in many of the subjects of sporadic or toxic goitre so commonly seen in towns. In a third group

the amount of iodine may be relatively deficient in proportion to the other constituents of the food; in a fourth we may have a food poor in iodine, and continued infection of the bowel by polluted water, as in the endemic areas in the Himalayas. Further, constipation and imperfect drainage of the bowel may be as effective as a polluted water supply. The measures to be taken for the prevention and treatment of goitre are therefore clear.

Major M. A. Nicholson challenges Colonel McCarri-son's results at the Lawrence Military School, Sanawar, from the use of enteric vaccine in goitre. "Neither T. A. B. nor typhosus vaccine had any effect, curative or prophylactic, remote or near, on the endemic goitre prevalent at the school. Endemic goitre is a condition peculiarly liable to spontaneous disappearance and re-appearance in its endemic form among children. These fluctuations of the thyroid should be taken into consideration in judging the effect of any particular line of treatment. There are still many who regard the chemical composition of the drinking water as the essential factor in the causation of endemic goitre."

Nervous and Mental Diseases.

D. M. Vasavada records the apparent cure of 2 cases of epilepsy by intravenous administration of peptone, with considerable improvement in a third case. S. C. Mitra describes 7 cases of encephalitis lethargica as having occurred in Calcutta almost simultaneously in April-May 1924. The age distribution was from 5 to 30 years and 6 of the patients were females. The onset was with fever, headache, and vomiting; and the course of the disease characterised by lassitude, asthenia, delirium, difficulty in speech and deglutition, spasmodic twitchings, paralysis of accommodation and ptosis. Only one of the patients survived, and in this the gait was ataxic and the speech still not clear at the 6th week.

Major O. A. R. Berkeley-Hill and P. C. Das discuss the question of syphilis and mental disease in India. Syphilis is not more common among the insane than among the sane in India; rigorous anti-syphilitic treatment did not improve the mental state of the patients on whom it was tried, and syphilis—in contradistinction to what occurs in Europe—does not appear to be an important contributory factor to mental disease in India.

Lieutenant-Colonel A. W. Overbeek-Wright writes from Agra as follows:—

"Here we have been working on galvanism and endocrine preparations and our results with both are most promising, though as yet not in sufficient numbers to warrant publication. Galvanism I apply as I describe it on pp. 371-372 of 'Lunacy in India.' My results with my own private installation have been so uniformly good that I have now got an installation in the Asylum. It is very markedly sedative and in addition tonic and bracing as well, and its results in many cases seem really marvellous. Hebeephrenia, mania, melancholia, neurasthenia, hysteria and similar conditions react to it rapidly and so far as I can judge permanently, but it is early days yet to dogmatise. Paranoia, G. P. I., katatonia and one or two similar conditions remain practically unaffected by it.

As regards endocrines, we seem to have practically eradicated status epilepticus from our causes of death by the prompt administration of pituitrin (1 c.c.) hypodermically so soon as symptoms threaten. Post-pituitary secretion has given excellent results in one or two cases of epileptic idiocy. Adrenalin hydrochloride also promised well in 1 or 2 cases of hebeephrenia. On the whole, however, mixed preparations are the best. Carnrick's 'Hormotone' has given good results in some climacteric and senile cases, but on the whole I prefer the preparations of the Instituto Terapeutico Romano; their 'polyendocrine neurotonic tablets' for instance have given and are giving us excellent results in hebeephrenia, paranoia, melancholia and other allied conditions. One has to continue for at least six months with

such cases before one can definitely pronounce the verdict, and as we have only begun this method of treatment this year, the utmost I feel warranted in saying from my own experience is that there seems to be great promise of immense benefit to be derived from endocrine treatment in many cases of mental and nervous disorders."

PHARMACOLOGY.

A number of papers of great interest were published from the department of Pharmacology, Calcutta School of Tropical Medicine.

Majors H. W. Acton and R. N. Chopra showed by a large amount of experimental work on animals that the phenomenon of susceptibility in different individuals depends to a large extent on the varying amounts of the endocrine secretions that are present in the tissues. The picture is that of a series of complex chemical interactions, where chemicals are aided or hindered by one another. The phenomenon known as idiosyncrasy, susceptibility, or sensitiveness according to these authors can be explained in this way. Drugs such as adrenalin, tyramin and pilocarpine produce entirely different effects on the blood pressure and respiration (bronchioles) of animals whose endocrine functions have been altered experimentally by extirpation of the thyroid or adrenals or by introducing large amounts of these secretions into the animals artificially. Idiosyncrasy of individuals to such drugs as quinine, or susceptibility to such diseases as beriberi, epidemic dropsy, etc., or sensitiveness of certain persons to the bases which produce urticaria, giant urticaria, asthma, etc., can be explained in this way. Major Chopra, Dr. Ghosh and P. De's observations on the toxicity of emetine are of interest to general practitioners. They sound a note of warning against giving a large number of injections of this drug to patients. By experiments on rabbits these authors have shown that emetine is a general protoplasmic poison having a selective action on the cells of certain organs. The parenchyma of the heart muscle is one of the earliest to be affected and this may account for the cardiac symptoms which sometimes occur during the course of injections.

The work of Majors Acton and Chopra on the local effects produced in the tissues by intramuscular injections is of practical interest in therapeutics. Antimony salts cause marked irritation and pain; emetine causes petechial hemorrhages and bruising; the salts of all the four main alkaloids of cinchona bark cause equally marked cedema, irritation and necrosis of the tissues.

Major Chopra and Dr. Asa Chandler have shown that santonin extracted from *Artemisia maritima* Linn (*A. brevifolia* Wall) which grows in the hill tracts of Kashmere State (Baltistan), closely resembles in its physical, chemical, and physiological properties the ordinary santonin. By trials on a series of cases they have shown that its therapeutic efficacy is just as good, if not better than that of imported santonin. If properly worked on a commercial scale, this santonin could be manufactured and sold very much more cheaply than the imported variety.

Major Chopra and P. De have shown that *Sassurea lappa* (kuth root) which grows abundantly in the mountains of Kashmere has three active principles, an essential oil, a glucoside and an alkaloid. These are pharmacologically active bodies and extracts made from the root diminish the number of attacks in bronchial asthma and reduce their severity and frequency. This drug is especially useful in cases of vagotonic origin, which form the majority of the cases in India.

Major Acton's paper on the vital processes that occur at cell surfaces is one of the most remarkable publications of the year. It is based on a large amount of experimental work done in conjunction with his colleague Major Chopra, and is of great pharmacological interest. Life processes essentially are rhythmic in character. They are conditioned by two main factors:—(1) Increase in electrical resistance at the cell surface which

causes a diminution in cell permeability, except to the inorganic salts which then ionise. (2) A diminution in electrical resistance with increased cell permeability, e.g., quinine is ten times as active at a pH of 6.0 as at a pH of 8.0 on *Paramoecium*. (3) Variations in permeability. Permeability is diminished by some organic substances, e.g., bile salts are antagonistic to and prevent the absorption of peptones and polypeptides from the gut. On the other hand some substances, such as electrolytes of inorganic salts, markedly diminish cell permeability to chemicals with large molecules. In living tissues a balance is struck. In dead tissues the permeability increases.

Another publication of pharmacological interest is one by Lieutenant-Colonel R. McCarrison who has shown that the action of adrenalin is usually favoured during the early stages of asphyxia, and disfavoured during the later stages. These effects of asphyxia on the action of adrenalin are due in the main to the gradually increasing carbon dioxide in the blood. The disfavoured effect of an excess of carbon dioxide on the action of adrenalin can be compensated for by increasing the concentration of adrenalin.

D. M. Vasavada advises 10 to 30 grains of sodium cocodylate intravenously in 5 c.c. of distilled water twice a week. He has seen good effects with this drug in cases of anemia, malarial cachexia, syphilis, psoriasis and sprue.

A pharmacological unit was established in connection with the Bombay Bacteriological Laboratory in charge of the Rev. Father Caius and Dr. Mhaskar. The Laboratory is well equipped and was opened for work on the 1st of June 1924. Work has been started on indigenous drugs and is already well advanced on *Holarrhiza antidysenterica* (kurchi) and *Butea frondosa* (polash).

A biochemical unit is also going to be opened in connection with the Bombay Bacteriological Laboratory.

SURGERY.

Major W. L. Harnett, F.R.C.S. (Eng.), writes:—

"It is pleasing to record that the output of surgical papers this year has been considerably greater than usual; many of them of a high order of merit and indicative of a spirit of progress and research. Surgeons in this country have tended in the past to confine themselves to stereotyped lines of work, content with an immense output of successful operations on conventional lines, and have shewn little disposition to embark on original investigations or to adventure into the more difficult fields, where exact scientific methods of diagnosis and elaborate technique are requisite. All this is changing, and with the improved equipment of the larger hospitals and the determination to make full use of modern methods, we may expect great progress in surgery in India in the near future."

Gastro-Intestinal.

Perhaps the subject which has aroused more attention than any other during the year is the question of the prevalence or otherwise of carcinoma and other surgical diseases of the intestine in Indians. Lieutenant-Colonel H. Halliday considers that among the hardy Sikhs and Pathans of the Punjab and N. W. Frontier Province such conditions as gastric and duodenal ulcer, appendicitis, cholecystitis, gall-stones, and carcinoma of the colon are very rare. On the other hand when the Indian becomes sophisticated and takes to European diets and customs, he may become the subject of intestinal stasis, appendicitis and carcinoma of the colon. As shewn in our editorial for last August, however, there appears to be a considerable difference of opinion on this subject among the authorities consulted, and much further information is wanted. The fine work being done in gastro-intestinal surgery by Lieutenant-Colonel E. W. C. Bradfield in Madras has been commented on in our columns. Colonel Bradfield shews that in Madras, at least, there is a wide field for such

surgery, and that, considering the emaciation and bad state of many of the patients dealt with, results are very good. He writes:—"As far as Madras is concerned, you have received the annual reports of the presidency hospitals, and I think they entirely disprove the idea that certain diseases such as cancer and surgical abdominal complaints do not occur amongst Indians. The trouble with most of our hospitals is that out-patients are generally seen and sent for admission by the least trained members of the staff, and that diseases which are not very obvious, or about which they have not been especially warned are usually missed.

I have asked my staff to put up a statement shewing the admissions for a few special diseases during the first 11 months of 1924. It shews that among 447 general major surgical operations for disease, 78 were cases of appendicitis, including 47 Hindus; 144 were duodenal ulcer, of whom 122 were Hindus; 23 were gastric ulcer, of whom 18 were Hindus; 12 were carcinoma of the stomach, including 8 Hindus; and 6 were carcinoma of the rectum, including 4 Hindus. Gastric and duodenal ulcers are very common, appendicitis not so rare as was formerly thought, while the more abdominal surgery we do, the more frequently are cases of gall-stones and their sequelae found. I think that dental infection is a very important predisposing cause.

I think the most marked advance in surgical treatment made in India during the last few years is in the treatment of abscess of the liver. Drainage has now been abandoned except in very rare cases, and the use of aspiration and emetine, which we owe to Sir Leonard Rogers, has reduced the mortality of this disease to practically nil."

The treatment of liver abscess is still inadequately dealt with in surgical text-books, and Sir Leonard Rogers' work and Lieutenant-Colonel Thurston's series of cases treated by aspiration have never received due recognition, and even recent works still advocate open operation. It is interesting to see that Colonel Thurston has again entered the lists in the columns of the *Lancet*, and that there is a revival of interest at home in this subject. Captain Sargood Fry's two cases of large liver abscesses which underwent absorption under emetine treatment alone, without aspiration, are of interest in this connection.

Drs. J. G. Martin and A. J. Jongewaard record an interesting case of a boy of 12 kicked in the abdomen by a horse, and admitted to hospital 8 hours later. There were almost no symptoms, and only slight local rigidity and a rising pulse rate indicated the necessity for laparotomy. Perforation of the jejunum was found, and the patient recovered after an end-to-end anastomosis. Dr. A. Bayley-de Castro records a case of strangulated diaphragmatic hernia of the entire stomach through an old stab wound into the left pleural cavity; the case proved fatal at operation. Captain J. B. Hance discusses the question of supernumerary spleen with reference to its causation and embryological significance, and records a case where the supernumerary spleen lay in the sac of a left inguinal hernia.

Calculus.

Lieutenant-Colonel A. J. Vernon Betts deals with litholapaxy and its limitations,—a most valuable paper which is the outcome of 20 years' experience. He advocates Weiss' lithotrites, and either an irrigator for washing out at a height of 2 feet above the bladder, or a special light type of evacuator made for him by Weiss & Co. The operation should be confined to those cases in which the stone can be easily grasped. The alternatives are median perineal lithotomy where the stone is just too big or too hard to be easily grasped or crushed; or suprapubic cystotomy for the residue of cases. His results are exceedingly good; 254 litholapaxies; 23 median perineal lithotomies; and 3 suprapubic operations; a total of 280 cases with only 6 deaths. K. S. Ranganathan records a case of vesical calculus with bilateral hydronephrosis, and R. M. Kar a case of vesical calculus associated with prolapse of the rectum.

Orthopedic Surgery.

An exceptionally interesting paper is that by Major W. L. Harnett on ankylosis of joints, shewing what a wide field there is in India for useful work in this class of surgery. Every Indian village and city swarms with cripples, yet given an enterprising and skilled surgeon and the co-operation of the patient very much can be done. In bony ankylosis it is often a mistake to do an arthroplasty; a sound ankylosis with a useful limb is often better practice. A very common cause of fibrous ankylosis in India is neglected gonorrhoea; physiotherapeutic methods, hot baths, paraffin baths, diathermy, massage and passive movements have a wide range of applicability here, but the most essential thing of all is to secure the patient's co-operation. Forced movement under anaesthesia to as great a degree as possible, followed by immobilisation in plaster of Paris is often very useful.

Lieutenant-Colonel C. A. Gonrly deals with two matters, anaesthesia and fractures. In connection with the first he pleads for more care and consideration in anaesthetising patients. Anxiety, fear and pain are all factors which go to increase shock in the patient. A preliminary injection of morphia and atropine will dull the senses before the patient is carried into the theatre; whilst the use of local infiltration or nerve block methods with local anaesthetics abolish shock, eliminate pain, and are of great value in reducing the amount of chloroform given to a safe level. There is much that can be done in operating theatres in India to reduce shock, which is too often neglected. In connection with fractures, x-rays should be used both before and after the fracture has been set and at frequent intervals subsequently; preservation of the vigour of the muscles and circulation by early movements from the outset is essential, also early restoration of functional utility by properly graduated exercises. Interesting figures are given for a series of compound fractures treated at the Sambhu Nath Pundit Hospital; of 39 consecutive cases 23 were cured, 8 were discharged otherwise and 8 died; "sepsis defeated us in 5 cases and 2 required amputation on account of long continued sepsis." These figures are capable of improvement. A compound fracture cannot be properly cleaned up without a general anaesthetic; restoration of bony deformity is a matter which there is no need to worry about until one is certain that all sepsis has been eliminated from the wound.

Antiseptics.

Major F. J. W. Porter, R.A.M.C. (retd.), advocates petrol for cleansing the skin prior to operation, as being both cheap and efficient, whilst Major A. H. Napier extols the virtues of electrolytic chlorine, "E. C." in surgical and midwifery practice. The skin at the site of operation is swabbed with pure E.C. the day before operation, and dressed with an E.C. compress of strength 1 drim. to the pint. It is again swabbed with pure E.C. before operation. A lotion of 1 drim. to the pint is used as a general antiseptic lotion. Cases are quoted of compound fractures practically converted into simple ones, of septic bone cases, carbuncles and canerum oris rapidly yielding to E.C. treatment, and of its use in operations on tubercular glands of the neck.

Intravenous iodine has received considerable attention during the year. Lieutenant-Colonel W. W. Jeudwine states that thrombosis after its use is very rare, and he has only seen two severe cases of thrombosis in some 1,500 injections; it is probably not due to using the alcoholic tincture, but to local irritation of the intima of the vein at the spot where the iodine solution strikes it. Lieutenant-Colonel F. P. Connor records the routine use in his wards of intravenous iodine in septic cases ever since 1913, and has found it especially useful in cases of streptococcal infections and septicæmia. He was first led to use it in connection with plague, and thinks that the results in plague are possibly encouraging. H. R. Wadhvani records its use in phlegmasia alba dolens, erysipelas, pelvic peritonitis, tubercular hip

disease, ischio-rectal abscess, in doses of $\frac{1}{2}$ to $1\frac{1}{2}$ c.c. of the tincture diluted with water and given at 3 to 5 day intervals; claiming very good results. Assistant Surgeon P. Bell, I.M.D., speaks of its value in pyæmia, recording a case where 4 injections and evacuation of pus from the hip was followed by rapid convalescence in a patient who was at first in a critical state. J. C. Chaudhuri claims to have used the method for some 6 or 7 years successfully in cases of cancrum oris, lobar pneumonia, enteric fevers, boils, carbuncles, and in pyrexia of uncertain origin with negative blood findings.

Carcinoma.

Dr. E. F. Neve contributes a valuable article on *kangri*-burn epithelioma. It is apparently due to chronic irritation by the heat of the *kangri*, the sequence of events being chronic dermatitis, epithelioma, sepsis, leading to the production of a foul and sloughing sore. The condition is evidence against the parasitic theory of cancer. The tumours are usually met with on the thigh or the lower part of the abdomen, and in advanced cases the deep femoral and even the external iliac glands may require removal. During the past 35 years as Srinagar, operations for *kangri*-burn cancer have averaged 45 a year. The technique adopted is to first remove the glands draining the area, and then deal with the cancer itself. It is often difficult to steer between the Scylla of imperfect removal and the Charybdis of excessive dissection in subcutaneous tissue, impairing the vitality of the thin skin of the groin or axilla.

K. S. Ranganathan records a case of what was apparently true primary carcinoma of the liver in an Indian coolie of 55; the diagnosis being confirmed pathologically. Major W. C. Paton records a case of carcinoma of the urethra in a Hindu male of 18, with retention of urine.

The question of betel-chewer's cancer has received some attention. Mr. R. L. Spittel contributes a striking photograph of a typical case to the *Lancet* and discusses the condition as met with in Ceylon. It is especially prevalent in Tamil women between the ages of 35 and 50. Also carcinoma of the tongue is not uncommon among them, whereas it is very rare in women in Europe. In a series of cancer cases at Colombo buccal cancer totalled 163 cases as against 137 of cancer of the rest of the digestive tract and only 13 of cancer of the breast. Histologically the condition is a typical epithelioma. Colonel Bradfield writes in this connection:—"The cancer of the cheek and jaw so common in South India is not due to the betel or tobacco which these people chew, but to the lime or *chunam* with which they are mixed. Samples of this lime contain 86 per cent. of carbonate of lime, and 50.3 per cent. of slaked lime and are very irritating."

General.

Major J. W. Barnett introduces a method of securing a high degree of local concentration of drugs in a limb by the use of a tourniquet and the intra-arterial injection of the drug. The drug must be alkaline or neutral in solution, must not cause coagulation of the blood and must not cause pain. Experimenting on cases of Madura foot he found that doses of sodium chloride up to 15 grains could be thus locally given with apparent improvement in the condition. He even suggests a technique for local concentration of drugs in the scalp areas, and considers that the method might be of value in local sepsis of the limbs and for the local administration of sera, e.g., of antivenene.

Two cases of *Rhinosporidium seeveri* infection are recorded; the first by T. S. Tirmurthi in a Malabar woman who had suffered for 20 years from this disease in the nose and had been operated upon 8 times; the second by Major W. L. Forsyth in a male patient aged 55 and coming from Calicut, where the left nostril, lacrymal sac and palpebral conjunctiva were all infected, and

the infected growths were suppurating. (As the recent and very fine studies of Professor Ashworth on this parasite shew, *Rhinosporidium seeberi* is not a protozoon at all, but a fungus of high order allied to the Schizosaccharomycetes.)

Gangosa has received some attention during the year. Dr. T. H. Holland records a striking case in Baluchistan, where yaws is unknown, in a male adult where, in addition to the nose being infected, the mouth was reduced to a tiny orifice. An operation to re-form the mouth was completely successful, and the Wassermann reaction was definitely positive. Lieutenant-Colonel J. R. J. Tyrrell recalls a similar case seen some years ago in Malwa, C. I., where the mouth was so much reduced that it would only just admit a goose-quill, and where re-formation of the nose and mouth were accomplished with success by operative procedures.

Assistant Surgeon J. Pereira records a case of local tetanus following on a wound of the dorsum of the foot, and cured by the administration of 4,500 units of antitoxin.

Major Harnett writes:—"Interesting and unusual surgical cases have been recorded during the year in great numbers. A. K. Ragavan records a successful case of drainage of a pancreatic cyst, and another of excision of a large lymphatic cyst of the neck. S. C. Das Gupta, L.M.S., records a case of abdominal injury successfully treated by resection and enterorrhaphy. Lieutenant-Colonel C. H. Reinhold, operating on a case of a large strangulated inguinal hernia, found himself unable to reduce the gut owing to the presence of a mass of cascating mesenteric glands in the ileo-cæcal angle; these were shelled out and the case did well. Space has allowed of only a few of the most remarkable cases being cited, but a special feature which we note with pleasure is the increasing number of surgical cases of interest which are recorded by Indian doctors in charge of small hospitals. Many of these operations would not be remarkable in a hospital in a large city, but when one considers the difficult conditions under which the work was done, the scanty equipment, the difficulty of sterilising dressings and appliances and the absence of trained anaesthetists and assistants, the successful issue of such cases reflects great credit on the operators."

Veneral Diseases.

Report after report, medical, surgical and ophthalmological draws attention to the enormous importance of venereal diseases in this country and to their very great prevalence. Much valuable work is being done by many official and unofficial and voluntary agencies, especially in the big cities of India, but the whole problem is so vast that decades must elapse before it is properly tackled. Propaganda and education are the only two remedies at present feasible.

Lieutenant-Colonel C. A. Gourlay, describing the work done at the Voluntary Venereal Diseases' Hospital for women at Alipore, comments on the unwillingness of patients to stay in hospital until cure is complete; they usually leave as soon as symptoms are relieved and can rarely be persuaded to undergo more than a month's treatment. A second important feature of the work is the great frequency of mixed infections; thus of 135 cases of soft sore, 98 also had syphilis, and 18 also had gonorrhœa. Acute gonorrhœa, which is a painless disease in the female, is rarely seen. In the usual chronic type of gonorrhœal case seen, the use of a wool tampon for dealing with the cervical canal, which is the spot requiring most thorough treatment. Pustular syphilides, so rare in Europe, are very commonly seen in India, and may even be mistaken for small-pox. Finding that cases of arsenical poisoning were occurring after the use of the scheme of treatment recommended for army use by Harrison, he weighed all the patients, and found that their average weight was only 6 stone. Clearly a dose for a robust British soldier

of 10 stone was too large for a weakly Indian woman of 6 stone, and doses were accordingly reduced. The present scheme of treatment consists of four weekly injections of Stabilarisan, which Colonel Gourlay prefers to the other arsenical derivatives, and mercury inunction daily for one month. On leaving, the patient is given a further one month's supply of mercury ointment in the hopes that she will use it. Relapses are common; e.g., of 324 cases admitted in one series, 128 had previously been treated in the same hospital.

Dr. C. F. Chenoy advocates the treatment of syphilis with bismuth, using Neotropol for preference in doses up to 4 c.c. by intramuscular injection. The results were good clinically in a series of cases; 9 illustrative cases are quoted. Major A. G. Tressider records a case of an unusual condyloma of the lower lip of a Marathi woman of 30, with a strongly positive Wassermann reaction, and M. L. Kundu two cases of progressive spinal paralysis in syphilitics undergoing treatment with 606. Such a condition, he believes, is not due to the treatment, but is not readily amenable to the usual routine anti-syphilitic treatment. The correct procedure is repeated lumbar puncture and intra-thecal injections of salvarsinised-serum. The cerebro-spinal fluid remains Wassermann positive, even after such repeated injections.

In the treatment of gonorrhœa, Assistant Surgeons J. R. Jacob and K. V. Verasingam advocate intravenous acriflavine, especially in early cases, where they have had rapidly successful results. The dosage recommended is 100 rising to 200 c.c. of a 1 in 500 solution, and 30 illustrative cases are quoted. If posterior urethritis is present, local measures are also necessary. Captain J. H. Barrett has introduced a new rod and guard electrode for ionisation of the urethra; a straight pattern for anterior urethritis and a curved one for posterior urethritis, with claims on account of its cheapness of construction and simplicity in use. Using zinc ionisation he records details of 35 cases treated, of which 29 were cured in from 3 to 12 applications, and in a period of from 7 to 40 days. Permanganate irrigations and hyoscyamus orally were used as adjuvants.

In this connection Major Harnett writes:—"The standards of cure adopted in some instances in such work are not sufficiently rigid. Many cases of gonorrhœa are of a mild type and the discharge quickly disappears under any treatment. It is not sufficient to say that gonococci are not found in the prostatic secretion. Repeated examinations, both microscopical and bacteriological, of the prostatic secretion after provocative injections, and a careful urethoscopic examination are necessary before such cases can be passed as cured. New methods of treating this disease are periodically brought forward, but all have so far broken down when tested by rigid scientific methods in institutions such as Rochester Row Hospital, where the cases can be followed up."

P. E. Pereira records the treatment of 69 cases of non-specific ulcer, with the Wassermann reaction negative, by 2 to 3 injections each of 2 to 3 c.c. of a 2 per cent. solution of tartar emetic, and claims that the method is worth trial.

HYGIENE AND PUBLIC HEALTH.

In a letter, the receipt of which we acknowledge with great pleasure on account of the authoritative status of its writer, Lieutenant-Colonel J. D. Graham, Public Health Commissioner with the Government of India, writes as follows concerning the general situation with regard to public health work in India:—"There is little to add to the situation so well described in your last year's report as reproduced from Colonel King's article in *Science Progress*.

Provincial autonomy in public health and sanitation has removed from the immediate sphere of the Public Health Commissioner with the Government of India much that formerly had to emanate from Simla or Delhi. The duties and responsibilities of the Central authority

will, I feel sure, gradually crystallise. Already international, national and inter-provincial matters in regard to public health, quarantine, the control of major ports, control of pilgrim traffic ex-India, control of emigration and immigration are definitely regarded as Central. The rapidly augmenting activities of the Health Committee of the League of Nations, and of the Bureau International in regard to health conditions in Asia generally must tend to centralise the disposal of such questions as arise, and this is in the nature of things a first step towards the establishment of such a central authority as is now considered necessary by most Federal States. The recent Port Administration Conference which, *inter alia*, had to deal intimately with port health had this in view throughout its discussions. The time may not be ripe yet for the constitution of a central health organisation on British lines; but no one who reads the signs of the times correctly can fail to see that such an organisation must in time be faced."

Major A. D. Stewart writes as follows:—"There has perhaps been little of note in domestic and public health legislation, either central or local. The Factories' Act is now in force throughout India, though some years must elapse before the benefit to the health of the rising generation is evidenced. The Workmen's Compensation Act is now general law and though cases of accident chiefly will be referred to it, the question of the deleterious effect of particular occupations on the workmen's health may possibly arise in the future. Political and financial reasons have probably been the cause of the dearth of public health legislation. Under the Calcutta Municipal Act of 1923, the Calcutta Corporation is now a thoroughly democratic body. The boundaries of the city have been largely extended and it yet remains to be seen how the Corporation proposes to tackle the many and difficult sanitary problems confronting it. The revision of the Bengal Municipal Act is long overdue and doubtless would have been undertaken but for the reasons above indicated. From a review of the annual reports of the Public Health Commissioner, India, and of the Directors of Public Health of the various provinces, it would appear that Bengal has given the lead in the matter of utilising local self-governing bodies in the prevention of disease. Each of the 26 districts of Bengal has now a District Health Officer who serves the District Board. The Government of Bengal in their review of the kala-azar problem recognises the stimulus that has been given to local sanitary endeavour during the last few years. A start has been made, though there are many difficulties that face the Health Officer, financial, legal, prejudice, antipathy and inertia.

Most provinces now have Food Adulteration Acts, though in some the absence of standards and laboratories has hindered action. Difficult as may be her own domestic sanitary problems, India cannot neglect the great importance and sanitary significance of her maritime trade; nor indeed are other countries, which fear importation of oriental disease, likely to let India forget her responsibility with regard to such infections as anthrax, plague, cholera and small-pox which may leave her shores. The position is somewhat complicated owing to the various and conflicting interests, commercial, social and financial, involved in the problem. The signatories to the International Sanitary Convention of 1912 were mainly concerned in preventing the entrance of oriental infectious diseases into their ports and territories, and the rules of this convention mainly refer to ships arriving at ports. All are agreed that revision of the convention is necessary and a draft revision has been prepared for ratification by the signatories. The League of Nations, however, since the treaty of Versailles, has interested itself in international sanitary problems and on its behalf Dr. Norman White made a special tour of the Far East to see how far the unratisfied revised convention was suitable to Far Eastern conditions; and whether a separate convention suitable

to Far Eastern conditions was desirable. Dr. Norman White in his report criticises the revised draft convention as unsuitable in its fundamentals and suggests a draft convention for quarantine procedure in Far Eastern areas where ports of departure and not ships are classified; and also the formation of a central International Epidemiological Intelligence Bureau for the Far East at Singapore. India's position is rather peculiar as it is represented directly on the International Board of Health which deals with the International Sanitary Convention, whilst it has no direct representation on the Health Committee of the League of Nations. The future developments will be awaited with interest—it is understood that the question of port sanitary authorities has received the close attention of the Government of India lately."

That serious steps are being taken to remedy the chief defects of public health administration in India will be evident to our readers. Thus in our issue for January 1924 an account was given of the ingenious methods adopted in Burma to try to ensure accuracy in the registration of vital statistics among an illiterate people; in our issue for last May we dealt with the re-organisation of the public health personnel in Madras, and in June and in the editorial for December with the scheme for the provision of a whole-time public health personnel in the United Provinces. To anyone interested in the immense questions of public health in India we would recommend a careful study of Lieutenant-Colonel S. R. Christophers' striking presidential address at the Medical Research Section of the Indian Science Congress, 1923, on "What Disease Costs India," published in our issue for last April, and one of the most thoughtful contributions to the question of public health work in India. The review of the medical aspects of the Indian census of 1921, published in our issue for last September, may also be not without interest. Such papers are in themselves so much of the nature of reviews that they cannot be reviewed.

Water Supplies.

Here there is a large volume of patient and careful work to review. Major Stewart writes that there has been a considerable expansion in the use of deep tube wells as a source of drinking water, especially in Bengal. Calcutta city is extending its present slow filtration system, whilst Bombay has practically decided to pass its large lake supplies through rapid sand filters, ensuring safety by chlorination. A considerable volume of work on water supplies has been published by the officers of the Bengal Public Health Laboratories. N. L. Bannerji deals with the pH reaction and the action of alum in clarification of water supplies. The optimum dose of alum requisite was found to vary with the pH present, and the total hardness of the water is important in this rôle. The dose of alum needed can be reduced by the preliminary addition of any cheap acid, such as sulphuric acid, and acid alum is preferable to basic alum. Here there is a lesson of great economic importance, since a great saving in the amounts of alum required may be effected.

Rao Sahib V. G. Raju describes the algal growths in the tank waters of Bengal. These, by their decay under the hot sun of the tropics, render the waters unfit for drinking. The chief causes of the decomposition are the accumulation of algal spores at the bottom and sides of the tanks, bicarbonates in the tank waters, the quiescence and transparency of the water, and an atmospheric temperature of about 75°C. He recommends thorough removal of the soil from the bottom and sides of tanks; the destruction of the bicarbonate by the addition of sulphuric acid; and to stop the practice of storing water in overhead reservoirs during the hottest part of the day when the heat kills the algae present. Major Stewart and the same author have studied the faecal organisms of surface waters in Bengal. *B. coli communis* was found to constitute 29 per cent. of the bacteria in human

faeces, 26 per cent. of those in septic tank effluents, but only 12 per cent. of those in cow-dung. In waters naturally purified it is rare; 70 per cent. of stored waters failed to shew it, whilst only 30 per cent. of waters stored for less than 18 hours shewed it, and here it constituted only 8 per cent. of the bacteria present. On the other hand the *B. neapolitans* is not so susceptible; it constitutes 32 per cent. of the bacteria in human faeces, 28 per cent. of those in latrine effluents, 37 per cent. of those in stored waters, and 51 per cent. of those in cow-dung. Advantage can be taken of the change in the bacterial flora in waters undergoing natural purification to differentiate a recently polluted water supply from one which has undergone natural purification. In water supplies recently polluted the *B. coli* content is at a high level, whereas it is nil in waters which have undergone prolonged storage.

With regard to the detailed chemical examination of filtered water, Rao Sahib V. G. Raju concludes that it does not give any reliable information about the bacterial efficiency of the filter. A study of the results obtained suggests that the nature of the organic matter and the condition in which it is present in the water are the chief factors which determine the amount that will be arrested during filtration, the condition of the filter bed and its filtering efficiency playing only a negligible part.

From Madras, Dr. Turkhud reports as follows:—

"The problem of finding out the best means of purifying the Madras city water supply engaged the attention of the committee on water filtration for nearly 2 years. In April 1923 the committee submitted a report to Government, pointing out that they had always been aware that mechanical filtration has been the correct method of purifying the supply, but that with the slow sand filtration plant already in existence their experiments up to that time had been directed towards discovering a method of making the existing plant work satisfactorily. All attempts had so far proved unsatisfactory, but the possibilities had been narrowed down considerably, and should the experiments then in progress fail to give satisfactory results, then no alternative would remain to the introduction of mechanical filtration. These final experiments were completed during the course of the summer. This want of success convinced Mr. Madeley, the Special Engineer to the Corporation of Madras, that the committee's original opinion that mechanical filtration was the only method which would give satisfactory results was correct, and he placed a detailed scheme for the modification of the present plant on a mechanical filtration basis before the Madras Corporation in his note of the 8th November, 1923. A second report dealing with Mr. Madeley's note and giving a complete summary of the whole situation with the committee's recommendation was forwarded to Government with the president of the committee's letter dated 13th June, 1924. The arguments for mechanical filtration advanced in this report are unanswerable. The problem of the Madras City water supply, so far as the committee is concerned, may therefore be considered as solved. It now remains to be seen whether the Madras Corporation will act upon the advice given by the committee.

(2) Experiments at the experimental filter installation in the compound of the King Institute of Preventive Medicine at Guindy are being continued. The experiments now in progress relate to the testing of the effect of a preliminary filtering of slow sand filters with alum. Results available so far show that the method is a promising one for certain types of water.

(3) The bacteriology of water supplies has been the subject of detailed study at the King Institute, Guindy, by Lieutenant-Colonel J. Cunningham and Mr. T. N. S. Raghavachari. They have followed up the work of the American water bacteriologists, based on the hydrogen-ion concentration produced by lactose fermentors in suitably buffered culture media, with a view to testing

the applicability or otherwise of these tests to Indian conditions, and also with the object of finding out if the application of these or other tests will yield a classification affording evidence of the origin of coliform bacteria found in water. In the preliminary paper which they have published are given the results of the examination of lactose fermentors derived from human and bovine faeces, and from samples of unfiltered water from rivers, impounded reservoirs and wells. They have reached the conclusion that their results agree with those obtained by other observers in different parts of the world and that they have not, up to the point they have reached, found any clue to the probable source of the organisms found in water. In their examination of human faeces they have had a unique opportunity—not to be obtained in any other country—of examining a totally vegetarian as well as a non-vegetarian community. The percentage of the high ratio group of organisms in vegetarians was 4.6 per cent. as against 0.4 per cent. for the non-vegetarians. This was an unexpected result, seeing that one would expect the vegetarian human faeces to approach more nearly to the bovine type, on account of the similarity of their diets.

Further work relating to lactose fermentors found in soil, grain and milk has been in progress during the year.

(4) The same authors have carried out an exhaustive study of a violet-producing organism which repeatedly appeared in 3 different water supplies, situated too far away from one another to have been derived from a common source. Except for certain minor deviations, this organism resembled the *B. violaceum* described by Lehmann and Neumann.

(5) Water supplies, using both bleaching powder and liquid chlorine for sterilisation, were systematically tested for efficiency, and expert advice offered whenever defects were noticed. One of the Paterson's chloronome plants installed at Fort St. George was thus tested and found to be too large for the supply and reported as such.

(6) A systematic investigation into the most suitable method of treating the water of the Narsapur canal with a view to using it as the water supply for Palacole Municipality was undertaken and brought to a successful issue. Mechanical filtration followed by systematic chlorination, has been recommended.

(7) The Fisheries Department of Government was faced with a peculiar growth that had been occurring in certain samples of dried fish, and wished to have the matter investigated from the point of view of their fitness for human consumption. The investigation showed that this discolouration was due to the growth of an organism called 'Rhodococcus,' and was the same as a condition which had just then been reported as occurring in England due to the same cause. It was advised that the dried fish which grew these organisms should be rejected as unfit for human consumption."

Vaccination.

In an interesting paper, Lieutenant-Colonel J. Cunningham and Major J. A. Cruickshank compare the relative values of lanoline and glycerine as vehicles for vaccine lymph in the tropics. They conclude (a) that untreated glycerine lymph is better than lanoline lymph under tropical conditions; (b) the former gives an average case success rate of 89 to 91 per cent., as against corresponding figures of 49 to 70 per cent. with lanoline lymph, whilst the vesicles produced are better and more typical with glycerinated lymph. Also the glycerinated lymph tends to keep better over a ten-day period.

In connection with further researches carried out during the year at the King Institute, Dr. Turkhud reports as follows:—

"(a) Routine Manufacture.—With Nijland's technique the potency of seed lymph is well maintained.

The 'vesiculation test' introduced by Cunningham and Cruickshank continues to serve as a reliable guide in judging the potency of routine lymph.

(b) *Research Work*.—(1) Experiments in lymph purification:—

The following methods of purifying the vaccine lymph have been tested under the conditions which obtain in the Madras Presidency. The experiments were carried out by Lieutenant-Colonel J. Cunningham, Major J. A. Cruickshank and Drs. D. A. Turkhud and C. G. Pandit:—

- (a) Chloroforming.
- (b) Ether.
- (c) Clove oil.
- (d) Brilliant green.
- (e) Untreated glycerine.

The results obtained are as follows:—

(a) Chloroforming lymph reduced the bacterial content to its correct limits; exposure for 10 to 12 minutes produces least deterioration in the potency.

(b) Sterilisation by ether was found to take too long, and to be uncertain in its effects.

(c) Clove oil proved to be a satisfactory reagent for purification purposes; the time required was 4 days' exposure, and the amount of deterioration of potency was small.

(d) Brilliant green in dilutions of 1 in 10,000 and 1 in 5,000 produced satisfactory bacterial purification in about 4 days; the loss of potency was inappreciable. The great disadvantage of this method is the extreme care that is required in the addition of sodium hydro-sulphite to stop the further action of brilliant green.

(e) Glycerine lymph without any particular treatment is purified to a satisfactory degree within 4 days of exposure to the ordinary temperatures found in the Madras Presidency. As the amount of deterioration in the lymph produced by the glycerine is a common factor to all methods of purification, and as the more rapid methods of purification may produce further deterioration, there is no advantage in introducing any of these rapid methods.

The authors therefore recommend that no special means of purification be introduced, and that untreated glycerine lymph be the authorised lymph for issue to the Madras Presidency.

(2) Other experiments were also done to obtain lymph free from contaminating bacteria. They tried the use of phenol (1 per cent.) and the action of light of different wave lengths. The latter was tested by the use of Wratten filters (Kodak). The effect of arc light, red and green light was then investigated, the time of exposure of lymph to light having been calculated in each case. Bacterial contamination was thus reduced to a third, while there was no reduction in the potency of the virus.

(3) *Studies in vaccinal and variolar immunity*.—Cunningham, Turkhud and Pandit have attempted to obtain evidence regarding the principle tissue concerned in the production of immunity. They have examined various tissues obtained from rabbits immunised by skin vaccination with a potent virus. So far they conclude that the specific immune substance resides chiefly in the serum and a little in the skin. Spleen, liver, brain ovaries and testes were all examined, but failed to show any evidence in this respect.

The reaction obtained with serum was very definite. Sera obtained from persons who had had an attack of small-pox some time or other showed a marked vaccinal effect, in one case though the attack was some twenty years ago. The same effect was also obtained with sera of persons who were only successfully vaccinated against it. It is now being investigated if this property of serum can be utilized in determining the degree of immunity in an individual.

Immunity studies in rabbits have also furnished some interesting results. Immunity in them is of a very short duration—the average in rabbits so far examined

being only 1½ to 2 months. In this respect different tissues seem to react differently. It appears that the cornea loses the immunity first, the skin follows next. The blood, however, retains it for a considerably longer period."

General.

Major Stewart reports that anti-cholera inoculation on a large scale has now been started in Bengal and has given very encouraging results. With regard to the treatment of sewage, the Chief Engineer, Bengal Public Health Department, has demonstrated successfully the possibility of the treatment of town sewage by land treatment in the unlikely soil of the Ganges' delta; large crops of sugar-cane and other grasses have been obtained, and this method of disposal is likely to become more and more widely practised in India as being both efficacious and economical. Dr. J. W. Tomb describes in our issue for last February a specially designed jar for the storage and preservation of chloride of lime.

Rabies.

Dr. E. C. R. Fox, I.M.D., Superintendent of the newly opened Pasteur Institute at Calcutta, writes as follows:—

"During the year a Pasteur Institute was opened in Calcutta. It rapidly became popular, owing to the convenience with which patients can get to Calcutta from all parts of Bengal. It has already treated about 1,400 patients in its first six months' work.

The issue of antirabic vaccine from Coonoor and Parel has been extended during the year to Indian States, military hospitals and railway headquarters. The first year's statistics of those treated in the Madras Presidency show that as good results are obtained by this system, as when treatment was available at Coonoor only. The reports for 1923 from all the Pasteur Institutes in India and Burma shew a steady increase in the number of patients coming for treatment. In this connection it may be of interest to compare the year 1914 with 1924. In the former year there were only two institutes open, Kasanli and Coonoor, which treated altogether 5,795 patients. In 1924 there were six institutes, and they treated more than 18,000 patients.

Major J. Morrison introduced the intravenous injection of antirabic vaccine at Parel in 1923 and continued it in 1924. The results so far are not conclusive, but the fact has been demonstrated that, given carefully, the treatment is safe.

Fresh interest in the organisms associated with rabies has been raised by the work of Levatidi and his collaborators on the virus of epidemic encephalitis and on other filter-passers, and it has already led Manouélian and Viala to describe their findings in rabies under the name *Encephalitozoon rabiei*. This work, however, requires confirmation.

Interesting figures are given in the report of the Pasteur Institute, Coonoor, shewing that the risk of dying from hydrophobia in persons bitten by rabid animals which are certainly infective is not less than 1 in 3, and that this risk may be diminished by one-half by antirabic treatment."

(In connection with Dr. Fox's notes, the writer begs to acknowledge the kindness of Lieutenant-Colonel J. W. Cornwall in supplying notes and information.)

MIDWIFERY AND GYNÆCOLOGY.

Miss M. I. Balfour reviews Dr. Janet Campbell's special report to the Ministry of Health, Great Britain, on the maternal mortality during childbirth, with special reference to Indian conditions. Conditions in England shew but little improvement during recent years, and, if so, what can be expected in India? There are several possible methods of advance, however; first, improvement in the quality of the professional attendance provided; secondly, ante-natal supervision, the supply and

control of midwives, the supply of sterile maternity outfits, and the appointment of obstetric consultants under action through the local public health authorities; and thirdly, social and educational measures. Indian maternal mortality rates average about 14 per mille, and must total about 109,000 or more deaths per annum. Ante-natal supervision can be introduced if every practitioner will create his own centre for such supervision; obstetric consultants suitable for India can be supplied in the form of trained lady doctors; whilst the training of midwives and *dois* is being steadily improved. By degrees very considerable and necessary advances are possible, if only the requisite efforts be made. Major V. B. Green Armytage stresses the same necessity for a scheme of ante-natal welfare in India, insisting on the need for the creation of ante-natal clinics, and giving a diagrammatic scheme for the examination of the expectant mother. Propaganda, efficient training of midwives, and co-operation on the part of the medical profession, he claims, are what are wanted. In a further and interesting clinical lecture to post-graduate students, he deals with infant feeding and the alimentary disorders of infancy.

National Health and Baby Week was celebrated all over India in January 1924, and in the main the results were both encouraging and successful. Sets of lantern slides and specimen lectures and demonstrations and illustrated leaflets were prepared and much propaganda work carried out in the vernaculars. Wall posters were a prominent feature of the effort in many presidency and provincial centres.

Major V. B. Green Armytage deals with the difficult problem of the efficient teaching of midwifery to Indian students in centres where facilities are scarce. He advocates the use of a felt or wool-lined wooden dummy model of the female pelvis and of a live baby, the demonstrations being given to classes of not more than 20 students in a warm room adjacent to a lying-in ward.

With regard to difficult labour, Major A. G. Tressider records the following cases as typical of Indian conditions:—(a) a 7-para with all previous children still-born, premature rupture of the membranes and a sluggish uterus. Successful labour with the birth of a living child was secured by the use of a *de Ribes* bag; (b) sluggish uterus and oblique presentation in a patient 44 years of age; Caesarean section was resorted to, but the child died from asphyxia six hours after birth; (c) a previous ventro-fixation necessitating Caesarean section; and (d) placenta praevia necessitating Caesarean section. Here he points out that the indications for Caesarean section in such cases are (1) when the haemorrhage has not been excessive and the maternal pulse is full and not more than 100 per minute, (2) when the cervix is undilated, rigid, and dilatation likely to be unduly prolonged, as in elderly primiparae, (3) where there is no previous likelihood of septic contamination, (4) with the pregnancy at full term and the foetal heart sounds active, (5) with disproportionate measurements between the size of foetal head and maternal pelvis, and (6) where the parents are particularly desirous of a living child; (e) eclampsia necessitating Caesarean section, where the foetus was dead, and the mother's life in imminent danger; and (f) dystocia with small round pelvis, necessitating Caesarean section, both mother and child surviving. His articles shew something of the unexpected difficulties which may be encountered in routine Indian midwifery practice.

R. Garg records a case of internal version in flattened pelvis, this method of delivery being in his opinion better than the attempt to apply "high" forceps, which often means forceps above the brim; and Captain N. N. Ghosh (T.C.) a case where intra-cardiac injection of $\frac{1}{2}$ c.c. of liquor adrenalin, 1 in 1,000, restored respiration in a case of a child born in a condition of white asphyxia. S. N. Misra records a case of missed labour of 15½ months' gestation, with delivery of a macerated foetus and recovery on the part of the mother; and

V. A. Krishnamurty a case of the tetany of pregnancy with onset at the 7th month of pregnancy, of 5 weeks' duration, and relieved by adrenalin injections. N. N. Ghosh discusses the question of the treatment of puerperal tetanus. It differs from tetanus due to superficial wounds in that the site of infection cannot be sterilised. He advocates repeated intravenous and intramuscular injections of anti-tetanic serum in doses of 1,500 to 3,000 units, especially by the intravenous route, and records successful results.

In gynaecology Dr. G. B. Archer records the case of a patient suffering from an enormous monolocular ovarian cyst, successfully removed. Before operation the patient plus cyst weighed 168 lbs., whereas after operation the patient without the cyst weighed only 67½ lbs., so that the cyst weighed considerably more than the patient. Dr. A. H. Driver calls attention to a "treatment" for prolapsus uteri which consists of the introduction into the vagina of the fruit of the wood apple, *Ægle marmelos*, which is often *in situ* for years. This is somewhat larger than and as hard as a cricket ball, and removal can often only be accomplished by the use of midwifery forceps. Lieutenant-Colonel J. C. Holdich Leicester draws attention to the publication during the year of V. de Verselow's "Toxæmias of Pregnancy" by J. M. Wyatt, Constable & Co.; and to the discussion in American and other journals of the pros and cons of radium versus operation in carcinoma of the cervix uteri.

OPHTHALMOLOGY.

Major R. E. Wright reviews the year as follows:—

"B. B. Mallick and P. C. Gupta record an orbital fibroma surrounding the globe and causing proptosis, of 3 years' duration in a Hindu, male, aged 35, removed successfully by Major Conlts with subsequent full vision.

Major Dickson, R.A.M.C., discusses butyn versus cocaine. He states 'in ophthalmic surgery at least butyn appears to be more than a substitute as it is superior to cocaine in several respects.' He enumerates all its advantages for instillation work. He recommends its use also for infiltration operations. He quotes Mathra Dass as holding that prolapse of iris following expression is a criterion of efficiency of local anaesthesia. He states that prolapse is more common after expression under deteriorated cocaine and less frequent after butyn, but states that the subject requires further investigation. Major Dickson emphasises that cocaine addiction is more common in India than is generally recognised. This important subject has been very fully dealt with both in England and America during the year and the pros and cons dealt with at length in the literature. Many of the advantages set forth above have been contested by research workers. It is noteworthy that butyn has not replaced cocaine in many large eye clinics. Cocaine should always be used fresh, otherwise is more dangerous. The popularity of cocaine among the Indian public appears to be due to its aphrodisiac action. Butyn has certain advantages, but few workers consider it so suitable as novocaine for infiltration operations in ophthalmic practice.

A. D. Shroff reports a case in which a scale of iron lying on the retina did not respond to the giant magnet till an attempt on the third day in succession, when it moved slightly, but not till a small incision was made in the sclera could it be extracted. The pull of the magnet did not cause any painful sensation.

Dr. W. A. Fischer describes a day at the Shikarpur clinic. The cataract work is done there in the 'season,' January 1 to February 15. In over 95 per cent. expression is performed. One hundred cataracts were done in the day under review. Rai Bahadur Kishendas Premchand finances the work which is in charge of Dr. T.

H. Holland of the Church of England Mission and the charity does splendid work. The various missions furnish a vast amount of ophthalmic relief in India, for example that at Tirupatur with Kugelberg in charge, and the Eye Clinic of Dr. Ida Scudder's Medical School at Vellore. Shikarpur is probably unique in being financed by an Indian philanthropist.

B. K. Narayana Row describes a case of a nervous female who developed exophthalmos during preparation for cataract operation in the cocaine eye. The patient had a rapid pulse and cystic goitre, but lacked most of the common symptoms of Grave's disease. The same author mentions a case of syphilitic hemianæsthesia with corneal ulcer cured by antisyphilitic treatment, and two cases of unilateral crystalline sychisis scintillans in patients of 28 and 40 respectively.

Major R. E. Wright records a rare case of encysted guinea-worm of the orbit. The specimen was identified by Prof. Leiper. The same author pleads for greater facilities for obtaining glass eyes in India and for special centres for the treatment of trachoma. He emphasises the importance of a knowledge of muscle-balance work in prescribing spectacles. He refers to the value of Lumière colour photography as a teaching method. He advocates dacryocystorhinostomy instead of West's operation in similar cases. He refers to the value of slit lamp microscopy, attention to which has been drawn elsewhere in our columns, and to the progress that has been made by its use in the hands of Vögt and Koeppe. Instruction in its use is available in the Madras clinic. Ophthalmoscopy by red-free light as a valuable addition to the methods for the study of fundus disease is noted. The experimental production of cataract in rabbits by infra-red rays he considers may throw light on the ætiology of cataract in India. The importance of protection against the infra-red is emphasised. Delhi green glass is mentioned as a possibility. Of late the limitations of Crookes' glasses for the tropics have been noted and peacock blue suggested. This subject is important. The way in which different tinted glasses are 'boosted' by opticians and empirically prescribed by medical men leaves much to be desired. Major Wright refers to von Szily's experimental production of cataract in young rats by depriving the mother of fat soluble vitamin A, and the possibilities foreshadowed correlating inadequate diet and cataract in India. In Madras, cataract is not associated with keratomalacia in the child. The child of a keratomalacic mother may be predisposed to cataract, but the association has not been observed.

The modern electric ophthalmoscope is discussed in an article by the same author and improvements suggested. These have been incorporated in the New Madras Model by Hamblin. A successful case of Diefenbach's procedure for reconstruction of the lower lid with a cheek flap and combined skin cartilage graft from the ear is published. In analysing 250 cases of Barraquer's operation, he discusses the possible effects on the solid elements of the vitreous which take origin from the ciliary region. He does not consider the procedure suitable for the type of cataract cases dealt with in Madras. He publishes a description of an operation for large corneal staphyloma by trephining and radial cauterisation of the ectatic scar tissue, giving reasons for its adoption, based on the fact that in a large number of eyes enucleated for staphyloma examined by him the posterior segment is normal, and if in such the tension could be kept down, there is no reason why the posterior segment should not remain so with the retention of light perception. The cauterisation reduces the ectasia without opening the globe. Major Wright and Lieutenant-Colonel Cunningham have conducted investigations on the strains of pneumococci responsible for hypopyon ulcer, with a view to grouping and subsequent anti-serum therapy. The same investigators have carried out experimental work on the transmission of the trachoma virus, using the subdural and intracerebral

routes in rabbits. Lieutenant-Colonel J. W. Cornwall has repeated some of the work.

Nimbkar points out the prevalence of bifocals amongst young persons wearing spectacles and the necessity for ordering bifocals only in those cases where they are absolutely indicated. There appears to be a vogue for lay persons asking for and ignorant doctors ordering unnecessary bifocals in the south of India, and they are frequently of bad pattern.

In his 1923 report Major Wright records 1,613 cataract operations; success rate 88 per cent., vitreous loss rate 1.23 per cent. With few exceptions the capsulotomy method is adopted. Primary capsule rupture, introduced by Drake Brochman in 1879, is still in vogue. Captain Verdon, who performed the bulk of the operations for the year, carried out one series of 376 in which he adopted a small peripheral iridectomy after delivery with very good results, 1.8 per cent. iris prolapse. Elliot's sclero-corneal trephining is still the operation of choice. In 7 cases said to be blind for more than 3 months some vision was regained in 2 after trephining. The report records 70 cases of keratomalacia. Of these 22 were unsuccessfully treated with sardine oil on the suggestion of McCarrison (instead of with cod-liver oil); it gave rise to diarrhoea. Thirty-six cases of Herbert's wedge isolation in glaucoma are analysed by Koman Nayar. Interesting case reports of long-standing iridocyclitis due to nasal sinus disease, pyocyanus ulcer of the cornea, Mikulicz's disease recovering under x-rays, Parinand's conjunctivitis, cavernous sinus thrombosis, and syphilitic meningo-encephalitis are detailed. The various members of the staff contribute to the report.

Major Wright summarises two publications issued by the Madras Government Press dealing with fundus diseases, prepared by him and his staff from the notes on patients subjected to special case taking in the Madras clinic from 1919-1922. One deals with 418 cases of diseases of the optic nerve. Syphilis accounts for 50 per cent.; of these 7 per cent. are simple atrophies including 5 cases of tabes (classical tabes is rare). Nerve diseases of unknown origin number 21 per cent. Amongst the remaining 29 per cent. were 16 cases due to arterio-sclerosis, 8 cases of atrophy due to pituitary enlargement or neighbourhood tumours, 5 of brain tumours, 11 of diabetes, 9 of albuminuria, 6 of meningitis, 'following child birth' 6 cases, malnutrition 9 cases, and one case each due to quinine, methyl alcohol, sphenoidal sinus disease, leprosy, malaria, occlusion of the central artery. Tobacco and alcohol were not incriminated. The other pamphlet 'Diseases of the Choroid, Retina, etc.' deals with 434 cases. The optic nerve was also affected in a number, so that certain cases recorded here are omitted from the preceding publication and vice versa. Again syphilis was responsible for over 50 per cent., retinitis pigmentosa was met with 64 times. Sugar was the chief factor in 17 cases, although 6 of these had syphilis. In only two was typical diabetic retinitis seen. Albuminuria was noted 43 times. In 26 of these (uncomplicated by syphilis or sugar, etc.) 13 showed characteristic albuminuric retinitis and 13 were atypical. The figures for arterio-sclerotic changes will be dealt with later."

K. N. Pradhan extols the value of electrolysis in trichiasis and records a case of traumatic rupture of the retina. The same author also describes a case of slight rupture of the retina by a tennis ball, with recovery under eserine instillations.

Dr. John Weeks, of New York, one of the most senior and distinguished ophthalmologists in America, visited some of the eye clinics in connection with the Indian universities early in the year and expressed himself highly pleased at the large amount of valuable work done in these institutions and their high state of efficiency.

Dr. H. T. Holland describes hereditary glaucoma affecting three generations; a mother blind at 50; four

of her sons blind respectively at 60, 60, 55 and 50 years of age, and a son of the third son almost blind at 30. A broad iridectomy was done on the last case in the eye which could still distinguish hand movements, with some improvement of vision.

One of the most important events of the year has been the formation of a strong committee in England under Sir Arthur Lawley and Lord Carmichael to organise and support measures against blindness in India and to help the work of the Blind Relief Association. The committee point out that there are 1 to 1½ million totally blind in every generation born in India to-day.

Dr. E. F. Neve contributes the following notes in connection with cataract extraction:—

"Barraquer's operation is still on its trial. In 1923 Major R. E. Wright reported 250 cases with 80 per cent. of complete successes as against 88 per cent. by the ordinary capsulotomy operation. Barraquer read a paper at the 1924 meeting of the British Medical Association, but in the discussion which followed the paper the balance of opinion was against it. It is doubtful whether Sinclair's method of extraction with specially designed forceps will meet with a more favourable reception in Europe. The great advantage of intraocular irrigation is the rarity of vitreous loss. Lieutenant-Colonel E. A. R. Newman, in a recent brochure, 'Irrigation in Cataract Extraction,' gives a record of 1,000 cases. Vitreous was lost on 36 occasions, a percentage of 3.8, and a lower proportion than the last Shikarpur record for intracapsular extraction which was 10.6 per cent. Only 9 of Colonel Newman's cases of vitreous loss resulted from the use of the irrigator; the others followed the use of forceps for extracting the capsule or followed the section before irrigation was commenced. These last were doubtless due to high tension. The use of the tonometer, if systematic, gives useful fore-warning.

Too much emphasis cannot be laid on the observance of antiseptic precautions. In cases where there is the least doubt, the conjunctival secretion should be examined bacteriologically and preliminary treatment carried out."

MEDICAL ENTOMOLOGY.

Dr. C. Strickland kindly contributes the following review of the year:—

"Medical entomology is conveniently considered in two water-tight compartments; one containing the creatures which come within the purview of the clinician, the other of the sanitarian.

(1) Among the 'clinical' sections we have a paper by D. Walsh who recommends for general use in insect-bites and stings the use of an ointment of dimol.

The other papers referred to are classified as follows:—

Muscoids. Warbles caused by the Oestrid fly, *Hypoderma lineatum*, have been found under the skin of a child by Cooley, also by Style: in the latter case the author suggests that the eggs had been laid in the ordinary way on a cow's hair, the milk of the cow had been accidentally contaminated by the eggs, and the child had drunk the milk and infected himself. Major Patton has reported that this fly is a common parasite of cows and goats in India. **Myiasis.** Keilin records infestation of the human intestine by flesh-fly maggots (*Sarcophagids*) which appear to live and develop normally in such a habitat: Major C. E. Southon's report is quoted:—'A sepoy aged 30, a suspected ankylostomiasis case, was given a eucalyptus mixture and passed 40 to 50 of the maggots.' Leger and Couput have reported infection

of the nasal cavity of a patient with 70 maggots of the fly *Chrysomya duar*.

Beetles. M. O. T. Iyengar has noted the infestation of a child by a coprophagous beetle, *Caecobius milans*. Mr. Bainbrigge Fletcher discusses the occurrence of Scarabaeids in Indian children and thinks that adult beetles enter the anus of sleeping children in search of food. Strickland has identified the cause of the common Indian affection 'spider-lick' to be one of the blister-beetles, *Poederus fuscipes*."

"**Mange, Mites, and Mite-Affections.**—H. E. Cross draws attention to the frequent transmission of mange from camels to man, with great accompanying irritation and sometimes suppurating sores. Kishida reports a mite in human urine (Mackenzie, however, has considered such cases to be due to accidental contamination). **Ticks.**—Blanc and Camenopetras note the removability of ticks causing 'tick paralysis' by covering them with an oil.

Scorpions.—Dr. Tomb has treated scorpion sting with *Liq. ammon. fort.* (B.P.) and has found that it gives immediate relief from pain.

Tongue-worms.—Fornara reports the occurrence of Linguatulids in a hernial sac and on the occipital lobe of the brain. In the latter case death followed with symptoms of acute meningitis.

Leeches.—Messinger describes the case of a woman who swallowed a live leech which accommodated itself below the vocal cords and caused much trouble before it was evacuated.

(2) In the public health compartment must be included papers on systematic entomological work, between which and those of more direct importance to hygiene no hard and fast line can be drawn; however, papers reviewed above under special diseases are not further noticed.

Mosquitos.—Captain Barraud has continued his valuable work on the 'Revision of the Culicine Mosquitos of India' in a series of papers and employs a wonderful series of plates illustrating them. Lieutenant-Colonel S. R. Christophers and Captain Barraud discuss the tracheation and wing venation of the mosquito, whilst Colonel Christophers in two papers has defined further the grouping of some of the Indian anophelines. Iyengar has described a new species of anopheline common in Bengal which he names *varuna*; it is annectant to *listoni* and *minimus*. Strickland on the other hand considers that there are no definable points of distinction between the African *funestus*, its Indian variety *listoni*, and *minimus*, and that therefore all these forms should be considered merely geographical races of *funestus*; *aconitus* on the other hand he considers a distinct form entitled to specific rank.

Fleas and plague.—Major Taylor and Dr. Chitré have succeeded in transmitting plague to rats and guinea-pigs through the agency of *X. astia* and conclude that the negative results of similar experiments by Hirst in Colombo were due to its climatic conditions being unsuitable.

Cockroaches.—Toda thinks that these insects may occasionally be the instrument of transmission of cholera.

Ticks.—Colonel Megaw has brought forward evidence that the carrier of certain typhus-like exanthemata in India may be *Rhipicephalus sanguineus*, which is not a very distant relation to *Dermacentor venustus*, the carrier of Rocky Mountain typhus.

Lice and Relapsing Fever.—Major A. J. H. Russell, and Drs. A. Ayyar and Ubhaya have studied outbreaks of this disease in the Madras Presidency during the cooler months and conclude that they were louse-borne.

Sandflies.—Major J. A. Sinton continues his monograph on the Indian and Ceylon *Phlebotomus*. Their connection with the transmission of specific fevers is dealt with elsewhere.

Dracontiasis.—Dr. Hamilton Fairley and Lieutenant-Colonel W. Glen Liston have contributed a number of articles dealing with the parasite in Cyclops.

Bowel diseases.—Janson and Dekester conclude that the part played by 'flies' in the spread of amœbiasis must be small.

Technique.—Major H. E. Shortt contributes an account of a method which he has devised for taking stereoscopic photographs of insects or other small objects."

LABORATORY METHODS AND VACCINE THERAPY.

Several interesting advances in laboratory technique, etc., have been published in India during the year. Captain R. H. Malone introduces a new and simple method of preparing collodion capsules for use in the study of biological problems; and Dr. S. N. Goré a simple method of preparing tenth dilutions. Dr. Goré has also worked out a simple method of detecting and estimating indican in the urine by an adaptation of his cotton-wool plug test, to replace Obermeyer's test. It is claimed that the new method is more simple, rapid and economical than Obermeyer's; also it is not affected by the drugs taken by the patient. A quantitative method is outlined by which by dilution of the urine the amount of indican present can be expressed in terms of indol equivalent.

Captain G. Shanks emphasises the very great value—necessity almost—for taking routine blood cultures in all cases of pyrexia of uncertain origin. He instances unsuspected infections with *B. pestis*, and streptococcal, staphylococcal, *B. influenza* and pneumococcus bacteræmias diagnosed by this method. Routine blood culture will often confirm a tentative diagnosis; not infrequently the diagnosis can be made by no other method; sometimes it furnishes an unexpected surprise. D. N. Bannerjee has studied the normal Arnetz index in 100 healthy Bengalis and finds that it presents an unexpected shift to the left, 52.55; and discusses whether this may be due to residence in a tropical climate or to latent malaria.

In the standardisation of vaccines, Lieutenant-Colonel J. Cunningham and Sub-Assistant Surgeon B. Timothy give a comparison of hæmocytometer values with Brown's opacity tube values. Colonel Cunningham and Assistant Surgeon Ramakrishnan have also studied 141 unselected strains of streptococci isolated from the routine specimens sent to the King Institute for examination; e.g., infections of the throat, ear, lungs, teeth, joints, intestine, uterus, bladder, cerebro-spinal fluid, etc., with a view to differentiating them on the basis of Holman's classification. Hæmolytic and non-hæmolytic streptococci have been found in almost equal numbers, the former being slightly in excess. The frequency-distribution of the various sub-groups of each of these two divisions differed markedly from the results of other observers, which again differ amongst themselves to a certain extent. If, however, the strains derived from skin lesions were omitted, the results obtained at the King Institute did not differ very much from those of Holman, Blake, and Fisk and Burky, who were all working on organisms from definite pathological lesions of a severe type.

SKIN DISEASES.

The work of investigating and classifying the skin diseases of the tropics continues in Major Acton's clinic at the Calcutta School of Tropical Medicine, and promises soon to yield valuable results for publication. This work has been greatly assisted by the services of that veteran artist Mr. B. L. Das, who illustrated Sir

Leonard Rogers' books. In our January 1924 issue we gave a résumé of Major Acton's paper on some rare skin diseases of the tropics; he dealt with dermatolysis of the face, epidermolysis bullosa—an extraordinary condition in which the skin of the body blisters wherever the clothing presses upon it, and at all points of pressure—mycosis fungoides, and scleroderma,—for the treatment of which last condition he advocates the administration of thyroid extract.

The same author, with Miss D. F. Curjel, describes the curious occupation dermatitis of jute workers. Those working at retting jute have their arms constantly immersed in the baths, and a non-suppurative folliculitis follows, caused by the mechanical blocking of the sebaceous gland orifices by plugs of the unexfoliated stratum corneum. The remedy is soap and water freely used.

From the same clinic G. Panja contributes two papers; the first on common skin diseases of the tropics. Several factors are concerned in such conditions; thus as regards age, leprosy and elephantiasis are very rare in children; in sex, mangoe toe is especially seen in adult women who carry out domestic duties in the courtyards of their houses barefooted, whilst unmarried girls suffering from leucoderma come for treatment of the condition with a view to improving marriage prospects. As regards occupation he quotes the callosities seen in Ooriya dandy-bearers; as regards season, staphylococcal infections are especially seen in the hot weather, and ringworm infections in the monsoon. The general practitioner is all too apt to mistake such common diseases as psoriasis, folliculitis and true leucoderma for syphilis. In the vesicles of "eczema," streptococci and fine yeasts are very common, and the condition is really a streptococcal dermatitis.

The same author deals with seborrhœic dermatitis in a second paper; varieties noted being dandruff, pityriasis steatodes of the scalp, seborrhœa olea associated with acne, and seborrhœa corporis. The organism responsible for the disease is the bottle bacillus of Unna, and the diagnosis can be established by microscopical examination. In treatment of an infected scalp, the crusts should be removed with ether soap, and the scalp should be washed daily with a lotion of sulphur or resorcin and ether soap. Salicylic acid and ichthyol may also be useful. In cases where the body is affected we have papular, nummular, circinate, psoriaform and eczematous types of lesions. The face, neck, lips, trunk and extremities may be affected,—the forehead frequently, whilst the scalp is frequently infected first. A sulphur or salicylic acid ointment or lotion should be prescribed, followed by a bath next morning. A dusting powder which has been found very useful generally in the clinic, and especially so for prickly heat has the following composition:—precipitated sulphur, 1 oz.; camphor, 1 oz.; zinc oxide, 2 ozs.; with talcum powder 3 ozs.

In a note on the cause of pemphigus contagiosus (Manson), published by Lieutenant-Colonel J. Cunningham and Assistant Surgeon Ramakrishnan, these authors have determined the exact position of the streptococcus which they find to be invariably isolated from cases of this infection. The cultural and biochemical reactions of this coccus have been examined in great detail, and the organism, which answers in every detail to the *Streptococcus subacidus* of Holman, has been definitely proved to be the cause of this affection. A vaccine prepared with this organism has proved most successful in the treatment of the disease.

MEDICO-LEGAL. POISONS.

In our contemporary *The Madras Medical Journal*, September number, a medico-legal case of interest and importance is reported from Palghat by A. N. Verghese and Venkatachella Aiyar (journalist). The defence produced expert medical evidence to the effect that the prisoners charged with gouging out the eye with the

finger were innocent, as this was not feasible without rupture of the globe. Lyon's *Medical Jurisprudence* was quoted in support and was held to refer to gouging the contents of the eyeball and not to removing the unruptured eyeball from its socket. Major R. E. Wright, called as expert witness by the prosecution, produced much evidence from the literature to show that avulsion of the eyeball by the finger was quite feasible and that Chever, as recorded in Lyon's work, appeared to use the term gouging loosely to include rupture as well as avulsion, that in face of other authorities such as Parsons, Ball, Axenfeld, Lyon's *Jurisprudence* could not be considered authoritative. He held that the eyeball submitted to him was avulsed either by the finger or a blunt instrument. The nerve was long and the sheath torn near the optic foramen. The nerve end and muscle endings when subjected to microscopic examination appeared torn. Of over 700 eyeballs investigated by him in the Elliot School museum only one specimen showed a nerve as long as that under investigation. In this case the eyeball was gouged out by the horn of a bull. The practice of avulsion by insanes was mentioned and instances quoted from literature. The defence referred to the weakest point of the optic nerve as just behind the eye. The prosecution expert allowed that this was where the nerve would give way if broken inside the intact sheath, but that when the globe was dragged upon the sheath gives way far back.

The case is important as showing the undue importance which may be attached to an old and inexperienced record laid down in a work which the law accepts as authoritative, namely Chever's on gouging as recorded in Lyon's *Jurisprudence*.

The accused were convicted.

Major R. B. Lloyd and Captain S. N. Chandra (T.C.) give a technique for the preparation of permanent stained specimens of red corpuscles from old blood clots, using clear centrifuged serum to soak the clot, and subsequently Leishman's stain. Major Clive Newcomb has studied the keeping properties of old blood stains. Up to two months all tests for blood were positive; after a year the guaiacum-turpentine and micro-spectroscopic test with cyanide and ammonium sulphide were positive, but the reduced hæmatin spectrum test failed.

The same author contributes an interesting article on the injuries produced by firearms at short ranges, with a view to detecting the weapon used. With a black powder gun the grains of black powder are recognisable at ranges up to 10 feet; in the case of a shot-gun the wound produced is a large ragged hole; with a revolver, unburnt grains of cordite can be recognised at ranges below 5 feet, whereas with long barrelled guns firing smokeless powder, no unburnt cordite grains could be detected at any range, however close.

Rai Bahadur J. P. Modi and D. N. Chatterji have studied the saponification of dead bodies in the U. P. and describe the findings in 6 out of 12 bodies studied. Saponification occurs in from 7 to 35 days, and the climate of Lucknow is more favourable to it than is that of Agra. Chemically, the saponified substance was found to consist of lime, soap, free palmitic and stearic acids, unsaponified matter and ash.

With regard to *poisons*, P. B. Mukerji records a case of chloroform poisoning by the oral route in a child of 12 who recovered under vigorous treatment. Major Clive Newcomb notes an interesting point in connection with aconite poisoning. A question was raised in court as to whether the tingling and numbness produced by aconite would not be sufficient to stop the victim from going on eating the sweetmeats or curry containing it, but as Major Newcomb shews, it takes some 10 minutes for the tingling to set in, and half an hour for full numbness to develop. He also comments on the common use by railway robbers of dhatura, administered in coffee, and records a case of fatal poisoning in a young girl with kerosene oil, accidentally

administered in place of quinine. H. C. Gupta records a case of extreme tolerance to morphia, the patient being able to take 40 grains hypodermically or 80 grains orally a day.

MISCELLANEA.

Major Knowles and temporary Assistant Surgeon B. M. Das Gupta record the finding of a Bodo as an accidental parasite in the saliva of a case of spleno-medullary leukaemia. The parasite had nothing to do with the disease, and the infection was a transient one. A successful culture was made in Boeck's medium. The same authors also record a study in culture of *Blastocystis* from several different species of animals and man. It is now clear from the work of several authors that *Blastocystis hominis* is a fungus of a high order, allied to the *Schizosaccharomycetes*, parasitic—according to Dobell—in the gut of almost every human being, and non-pathogenic. Three different modes of multiplication, by binary fission, and exogenous and endogenous spore formation, are described. The chief importance of this intestinal parasite is that it may easily be mistaken by the tyro in the examination of faeces for the cyst of one or other of the intestinal protozoa.

Lieutenant-Colonel W. C. Ross describes the life-cycle of *Herpetomonas* as being entirely different from what is usually accepted, and considers that binary fission does not take place; also that the parasite is a tissue-inhabitant in flies and that conjugation occurs.

Lieutenant-Colonel C. C. Murison comments on the hospital working day; shewing how lax is the state of affairs with regard to recording the date and hour of admissions, a matter upon which questions may sometimes have to be answered in court. He advocates adopting the 24-hour continental time system, and stating whether local time, railway time, etc., is referred to.

MEDICAL MISSIONS IN INDIA.

Dr. Ernest F. Neve writes from Kashmir as follows:—

"In February 1924 Colonel Megaw wrote an important article on 'India in a state of grave emergency' in which he drew attention to the enormous death rate in India from preventable diseases—about 5,000,000 per annum, and the serious diminution in efficiency of the individual worker from the same cause to between 20 and 30 per cent. He pointed out the effect of this on economic conditions. Two months later an address by Colonel Christophers was published which dwelt very forcibly with the same theme. Not only do these appalling physical conditions exist with their terrible toll of suffering, economic loss and death, but the whole matter is inextricably mixed up with ignorance, warped mental outlook and even religious prejudice, such as, for instance, the Hindu attitude towards small-pox.

If, as we believe, good government should ultimately rest on the consent of the governed, how very important from a political standpoint is the good-will which has been and is being gained by the ministrations of medical relief and public health workers in India. In many districts, for one person who knows the chief administrator, the political agent or British resident, thousands and even tens of thousands know the leading doctor, if he is active and in addition to a large central hospital also carries on district work.

What splendid opportunities there are here, not only for medical and surgical aid, but also of dealing with root causes and of influencing the peoples and bearing witness to higher standards of life, healthier and more sanitary environment, a more enlightened mental outlook and higher moral and ethical ideals.

It is very difficult to obtain information as to the percentage of the population of India for which Western

medical aid or indeed any kind of skilled treatment is available. In the more important centres the Indian Medical Service has rendered splendid service on a large scale. The number of Indian private practitioners is steadily increasing, but these resort mostly to the larger towns.

The work of medical missions in India has become increasingly important. Not only are there many large hospitals and extensive district work carried on in many parts of India, but most of these institutions are out with all their power to strike at the causes of disease and to do their utmost for the moral and ethical uplift of the masses.

At the present time there are approximately 300 medical missionaries in India. Of these about 185 belong to the Medical Missionary Association of India, the president of which is Dr. E. Muir of Calcutta. A quarterly journal is published, edited by Dr. R. H. Goheen of Vengurla, with original communications and an up-to-date résumé of current medical literature. One of the most interesting features of this journal is the insertion of reports of the work of mission hospitals. A reference to only a few of these hospitals will indicate the importance and extent of the work; the Miraj Hospital and Medical School, the Women's Christian College at Ludhiana, the Frontier Mission Hospitals of Kashmir, Peshawar, Bannu and Quetta, the Annual Clinic at Shikarpur and the great activities of the Arcot and Neyoor Hospitals. Altogether there are more than 200 mission hospitals in India, some of which are working on a very large scale and many of which are exceedingly well organised and equipped.

India owes a debt to the United States of America for 118 medical men and women, working in these institutions.

The value of this work in these times of inter-racial strife can hardly be overestimated. It is a power making for friendship and eminently constructive.

Probably there is no agency in India at the present time which is more beneficent in its action, and certainly none which does more to demonstrate the nobility of service and to make the ideals of the Christian faith acceptable to the people."

SERVICE NOTES.

Major C. J. Stocker advocates the entire re-organisation of the Indian Field Ambulance, both as regards personnel, equipment and means of transport, of tentage also, to suit it for conditions of warfare on the N. W. Frontier. His article, which is a long and detailed one, and which was published in our issue for last July, is worth consideration by all military medical officers.

Lieutenant-Colonel R. A. Needham, Deputy Director-General, Indian Medical Service, writes as follows:—

"The report on the Lee Commission was published in May and they recommended far-reaching changes in the organisation and administration of the Medical Services in India. They recommended that no attempt should be made to retain the I. M. S. in its present form and new proposals were put forward for the creation of a purely military medical service for Indian troops and for the creation of a series of Provincial Medical Services. These proposals involve military as well as civil consideration and are still under the consideration of Government.* At the September session of the Legislative Assembly, the Government's position was expressed in the following three resolutions:—

* An official communiqué has subsequently been published stating that, in the main, the Secretary of State has accepted the recommendations of the Commission, but that a decision as to the future of the I. M. S. has not yet been come to.

(1) That the following recommendations of the Royal Commission on the Superior Civil Services in India be in principle approved:—

(a) That while the existing system of appointment and control of the All-India Services should, in present conditions, be maintained in reserved fields, the following services operating in transferred fields, namely, the Indian Educational Service, the Indian Agricultural Service, the Indian Veterinary Service, the Buildings and Roads Branch of the Indian Service of Engineers in those provinces in which the two branches have been separated, and the Indian Forest Service in Bombay and Burma, should, so far as future recruits are concerned, be appointed, and controlled by local Governments; (b) that recruitment of Indians for the Services in reserved fields should be increased as recommended; (c) that, having particular regard to recommendation (a), early steps be taken to constitute the Public Services Commission contemplated by Section 96-C of the Government of India Act, and to enact such legislation as may be necessary;

(2) that pay, passage concessions and pensions be granted to the officers of the Superior Civil Services in India approximately on the scale recommended; and

(3) that the recommendations of the Royal Commission regarding the constitution of Provincial Medical Services in Governors' Provinces be accepted in principle, subject to:—

(a) The employment in the provinces of an adequate military reserve; (b) the provision of adequate medical attendance for British officers in the Civil Services and their families; and (c) the further consideration of the conditions necessary to secure an adequate number of British medical recruits for the needs of the Army.

In this connection it is interesting to note that the I. M. S. consists at present of:—

| | | | |
|--------------------|------|----------|--------|
| Permanent officers | .. { | European | .. 531 |
| | | Indian | .. 148 |
| Temporary officers | .. { | European | .. 4 |
| | | Indian | .. 145 |

Casualties.

Died.

Major E. J. C. McDonald and Major F. W. Cragg.

Resigned.

Capt. B. F. Beatson (granted a permanent commission in the R. A. Force from 7th November 1923); Capt. A. G. Cowper; Lieut. I. C. Robertson.

Retired.

Major-General Sir G. G. Giffard; Major-General C. H. Bowle-Evans; Major-General B. H. Deare; Major-General W. E. Jennings; Major-General J. Jackson; Colonel W. G. Pridmore; Col. Bhola Nauth; Col. V. B. Bennett; Lieut.-Col. S. A. Harris; Lieut.-Col. L. B. Scott; Lieut.-Col. F. H. Watling; Lieut.-Col. J. J. Urwin; Lieut.-Col. V. E. H. Lindesay; Lieut.-Col. W. H. Kenrick; Lieut.-Col. P. St. C. More; Lieut.-Col. J. W. Grant; Lieut.-Col. N. W. Mackworth; Lieut.-Col. J. Entrican; Lieut.-Col. J. M. Holmes; Lieut.-Col. E. M. Illington; Lieut.-Col. W. G. Liston; Lieut.-Col. F. A. Smith; Major H. Falk; Major W. P. G. Williams; Capt. P. J. Veale (died on 30th July 1924, after retirement)."

The writer of this rather lengthy review cannot bring it to a conclusion without expressing his gratitude to the many contributors who have so kindly, and at considerable personal trouble, helped to make it what he hopes is more of a symposium by different authorities than the work of a single reviewer.

R. KNOWLES.

Original Articles.

THE PROBLEM OF EPIDEMIC DROPSY AND BERIBERI.*

By HUGH W. ACTON,

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and

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Introduction.—Up to the present time, the general consensus of opinion has been that the two closely allied diseases, beriberi and epidemic dropsy are caused by some deficiency of an essential substance (vitamine) in the diet. We look upon these two diseases as belonging to a group syndrome, where the three main signs are œdema, hypertrophy followed by dilatation of the heart, and peripheral neuritis. In epidemic dropsy usually only two of these signs are present, i.e., the œdema and the effects on the heart, and in dry beriberi there are cardiac lesions, marked peripheral neuritis but little or no œdema. Between these extremes, there are overlapping cases where these three signs vary in extent. We can therefore compare it to a syndrome like asthma where there are diverse poisons all producing the characteristic signs of this condition, viz., bronchial spasm and turgescence of the mucous membrane, but in varying extent; so that we get cases of almost pure bronchial spasm and others largely with bronchial turgescence. As will be seen later, we consider the cause of this syndrome of beriberi to be due to certain poisons elaborated in the food which is improperly stored; thus we have seen these symptoms and signs produced by rice, by the exclusive use of tinned provisions (Mesopotamia and Calcutta), and in Labrador it is stated that eating dried codfish causes this disease. The upholders of the rice theory immediately advance the argument; did these people eat rice, say as puddings, or was the flour adulterated by the cheaper rice flour? There is no need for this refinement, as we know that provided the same proteins or amino-acids are present, the decomposition of an amino-acid-like tryptophane to indol is not the exclusive property of a single proteid or single species of bacteria. We can safely say however that the vast majority of cases seen in clinical practice occur amongst those whose main article of diet is rice.

The first point that has to be settled is whether the disease is due to eating rice or not? The following objections have been raised against the rice theory in Castellam's "Text-Book on Tropical Medicine," (1919), page 1677.

(i) "Beriberi may occur in people who do not feed on rice. We have seen an epidemic amongst officers on a man-of-war." Against this objection we may state that beriberi occurs—though rarely—amongst British troops who are not rice eaters, but who take a certain amount of rice as rice puddings or in lieu of potatoes, as in Mesopotamia during the war. The rice issued is frequently diseased, e.g., on the R. I. M. S. *Investigator* in the Persian Gulf. Moreover under these conditions there is a large amount of tinned provisions used as food.

(ii) *The geographical distribution.*—"In populations eating the same kind of rice, some suffer from beriberi and others do not." In Bengal, epidemic dropsy is a disease of the middle class Hindoos, whose diet is mainly rice. The neighbouring Mohamedan population, although eating the same rice, take a smaller quantity of it owing to the inclusion of bread, meat, etc., in their diet. Again, the poorest classes live largely on a small grained rice of a coarse quality, but freshly milled, and rarely suffer from this disease.

(iii) "Tamil coolies in Ceylon do not get beriberi though they suffer from this disease in the Straits Settlements. In both countries they are mostly supplied by the same kind of rice, Rangoon rice." Our experiments show that a hot moist climate is necessary, such as occurs in Calcutta during the middle of July to September for infection to take place in the rice, thus explaining the peculiar distribution of the disease.

(iv) "People recovered from beriberi go back to their usual rice diet without suffering from the disease. Thus in the Malay States the mortality is only 20 per cent. therefore 80 per cent. of the sufferers recover. Do these people change their diet?" Our contention is that the disease is due to infection of the grain and the formation of poisonous bases. As long as healthy grain is eaten no disease occurs. Conversely as soon as the supply of diseased grain is exhausted, they then live on healthy grain and without any change in the diet recover, irrespective of avitaminosis.

Now having considered that we have satisfactorily answered these objections raised by Castellani against the rice theory, and moreover that all the ætiological factors point to the same conclusion, we can safely assert that in the vast majority of cases, both beriberi and epidemic dropsy are diseases produced by eating rice.

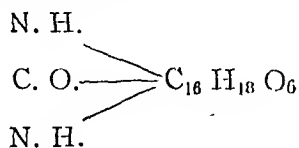
Eijkman, in 1897, showed that prisoners fed on red unpolished rice escaped the disease, whilst those fed on white polished rice were very apt to suffer from beriberi. Both he and Voderman considered that this was due to a loss in the protection of the grain. Fraser however failed to produce beriberi in prisoners fed on polished rice. The difference between these two forms of grain is that white rice is deprived of the peripheral layer during the milling processes.

The works of Eijkman, Braddon, Vedder and Chamberlain have made it sufficiently clear that beriberi is caused by eating *polished rice* and is prevented by eating unpolished rice.

Casimir Funk described a base that was present in the pericarpal layers, a diamine belonging

* Received for publication, 21st November, 1924. Being a paper read before the Medical Section of the Asiatic Society of Bengal on the 12th November, 1924.

to the pyrimidine group and of the following constitutional formula:—



This base is soluble in water, alcohol, dialyzable and can stand heat up to 130°C.: it is present in the proportion of 0.1 gramme per kilogramme of rice polishings:—the term polishing is often held to include rice bran and the polishings. Funk regards this base as an essential to the nervous tissue metabolism, and if not present in sufficient quantities, the nerves break down and as a result beriberi occurs in the individual. In 1917, Chick and Hume showed that in order to keep a person in health there must be (1) a proper supply of proteins, carbohydrates, fats, salts, and water, (2) an adequate amount of vitamins. These vitamins have not been isolated in a pure state in order to determine their chemical composition, but some are water-soluble, others alcohol—and others fat-soluble. They can stand a temperature up to 100°C., but are destroyed at 120°C. The vitamine of importance in beriberi has been named the anti-neuritic or anti-beriberi vitamine, the first includes the polyneuritis of fowls. The vitamine theory in some form is universally accepted at the present time to explain the cause of these so-called deficiency diseases.

Manson brought forward the hypothesis that a germ may be present in the soil, house, or ship, and under certain conditions of temperature and moisture may grow and produce toxins which when ingested cause the disease. Moreover, this germ may be carried by man from place to place. He also pointed out that the disease clings to ships, and appears year after year when the tropics are reached. In support of this theory he points out (1) that when patients are removed from an epidemic area they at once begin to recover; (2) he quotes Hirota's observations, that 52 infants nursed by beriberi mothers showed signs of the disease and did not improve when treated medicinally, but when taken from these mothers and placed with a wet-nurse or on artificial foods rapidly improved. He rightly points out that these children must have been poisoned by some chemical substance and not infected with a germ. But of course the germ producing the toxin might be in the mother's body.

Yamaguchi considers beriberi to be caused when the rice is improperly stored or preserved as it occurs even when this rice is well boiled. Bradon ascribes the disease to the ingestion of a poison found in the rice which is the result of a specific product of some organism, epiphyte or parasite, but he does not believe the disease to be due to the ingestion of the organism.

This briefly is the present position of the beriberi problem.

(a) The majority of observers consider that it is a deficiency disease due to the lack of an essential vitamine.

(b) A few consider that it is due to a poison produced in the grain by some organism or by defective preservation or storage.

Our work commenced with the production of certain poisonous bases produced in an amino-acid broth by the *B. dysenterica* (Shiga) 1922. Again in the same year when working on lathyrism which is caused by eating *kesari dal* (*Lathyrus sativus*), we found certain bases, not alkaloids, by which we were able to produce the disease in animals. On going away on furlough, Colonel Megaw handed us over the results of his clinical and statistical enquiry into the causation of this disease, which he has now published (1923). Naturally as we had been working at these bases, the first thought that occurred to us was whether we were dealing with a similar problem to ergotism, where alkaloids and bases can be produced by the *Claviceps purpurea* from the proteids of rye; these are able to cause vaso-constriction (gangrene) and neuritis sensory (anæsthesia). In beriberi, which is due to rice eating, the symptoms caused are due to an increased capillary permeability (œdema) and a neuritis motor (paralysis). The problem that lay before us was to identify the diseased rice from the healthy, to isolate the organism producing the disease in the rice grains, and to separate the bases, and reproduce experimentally in animals the symptoms produced in man. On the other hand we could not totally disregard the vitamine theory, when such skilled workers as Hayden, DeSilva, Chick, Hume, Moore and Webster had made this theory acceptable to the medical profession. We hoped by our experimental data to harmonise these two opposite views on beriberi, and to show that when the pericarp is removed by polishing, there is lost, not only the mechanical protection of the grain, but also valuable antagonistic substances. Under certain conditions of temperature and humidity, especially if rice is stored in infected godowns the rice rapidly becomes diseased. This diseased rice contains bases that cause a rise of limb volume with a fall of blood pressure, indicating œdema, increase in the amplitude of the heart-beat explaining the hypertrophy, and a rise in intra-ocular tension, the cause of glaucoma in epidemic dropsy.

If we consider beriberi to be produced in a similar way to asthma we will have three things to consider:—

- (1) The nature of the poisons produced.
- (2) The endocrine mechanism.
- (3) The state of the nerve endings that receive these poisons.

During the last three years we have had several difficulties to contend with before we were able to complete this work. In the first place when we commenced working on rices, that caused epidemic dropsy we were able to show the existence of substances that produced a rise in the limb volume and an increase in the intra-ocular tension, but when working on Burma rice we were hardly able to demonstrate the presence of these bases, and it was a long time before we realized the difference in the chemical composition of these two rices. Again, we found that animals varied

widely in their reactions towards these poisons: this meant the investigation of the causes of susceptibility, and our results were published in *The Indian Medical Gazette* for July 1924.

The neurotoxic principle again proved a stumbling block until we discovered it was alcohol-soluble and not water-soluble and moreover that it paralysed the para-sympathetic. The last difficulty to be overcome was the production of these bases in sterile media from laboratory cultures. For a long time, when growing the cultures aerobically, we were only able to produce the water-soluble bases. It was not until we realized the anaerobic thermophilic nature of rice decomposition, that we were able to produce the neurotoxin by raising the incubator temperature to 50°C. and making the cultures anaerobic.

THE INFLUENCE OF THE SUBSTRATE.

Before we can appreciate the differences in the different grades of rice, we must be able to judge the character of the fruit. The usual classification adopted by the market has been to name a rice after some prominent character, e.g., *Patni*, from the centre of export; *Peshawari*, because it was handled by up-country merchants; *Basmati*, fine flavoured, etc. A better idea of the quality of the rice can be obtained by the following description which we have evolved in trying to understand, how rice caused epidemic dropsy or beriberi.

The texture of the fruit. By the water test, two main varieties are seen by looking at the grain in water—

(a) Coarsed grained fruit: the grains may be short and plump such as the Burmah rice, or long and plump like the *desi* or indigenous rice, e.g., *Ashu*, *Nagra*, *Patni*. The grain has a horny-like appearance, and is known to be not very digestible, but sweeter. These rices are new, sell at from 5½ to 6 seers to the rupee, and are eaten by the poorer classes. When allowed to season, they give a very sweet rice which is mainly used for *payesh* (rice cooked in milk).

(b) Finer grade rice: the fruit may be long and fine like the *dadkhani*, or long and medium such as the *Peshawari* and *Kaminibhog*, etc. The grain is semi-translucent and the better the grade the more waxy is the appearance. These rices are more digestible and command a higher price, from 3½ to 1 seer for the rupee, and are usually eaten by the middle and upper classes. When allowed to season, this class produces a very digestible rice, which is eaten with curry, *dal*, etc.

The quality is also dependant on the crop. Thus in Bengal there are two main crops in the year—

(i) The *aus* or early crop is sown broadcast in April, and is reaped during July and August and September. It is generally regarded as being poorer in quality, very indigestible and causing diarrhoea. It is eaten by the poor, and is also used as food for animals.

(ii) The *aman* or winter crop is the better crop of the year: the rice is transplanted in June, July and August and is harvested in November and December, it is spoken of as the *chotan aman*. This is the rice that is largely eaten by the middle class Bengali families. The *boran aman* is a coarser kind of rice sown broadcast in the beds of the *jheels*, and in very low-lying land in May, and gathered in December and January.

The *boro* or spring rice is far less important than the above mentioned crops and rarely comes into the markets of larger towns. We have therefore two grades of rice—

(a) The coarser rice: more horny in appearance, more indigestible and eaten by the poorer classes owing to its cheapness. It is largely derived from the *aus*, *boran aman* and *boro* crops—and as we will see later this rice is concerned with beriberi.

(b) The medium and finer grades: more waxy in appearance and more digestible and eaten by the middle and better classes. This is derived mainly from the *chotan aman* crop, and if diseased causes epidemic dropsy.

In Bengal, epidemic dropsy is a disease of the middle class Bengali, whose main article of diet is the medium grades of rice; whereas the Chinaman, who lives on the highly polished coarser rice, suffers from beriberi. The distinction between the two diseases is very fine; in epidemic dropsy, cedema and the effect on the heart are prominent, whilst glaucoma and a slight degree of neuritis is sometimes seen. In beriberi, the neuritis and the heart signs are always marked, but the cedema may or may not be present and glaucoma is rare. The poisons produced in the two substrates cannot be identical in amount, but in extreme cases, i.e., dry beriberi and epidemic dropsy without loss of knee-jerks, the poisons can be readily separated in the rices, but there must necessarily be a good deal of overlapping when the substrates are like each other in chemical composition, e.g., when the medium grades approach the coarser quality.

THE PREPARATION OF THE RICE FOR THE MARKET.

(a) The husks are prepared for removal from the *paddy* or *dhan* in one of the three ways—
(i) *Atap* or sun-dried rice, is prepared by soaking the paddy in cold water for 24 hours, and then the grains are dried in the sun by being spread out in thin layers on cemented or specially prepared platforms, hence the name *atap* or sun-dried. This rice is generally eaten by orthodox Brahmins, widows, and at certain festivals, for the Brahmins are not allowed to eat food other than that cooked by their own hands. This method of preparation of the rice does not destroy the enzymes of the grain. (ii) *Balam* rice consists of *paddy* which is husked after hot water

has been sprinkled on it. The water inflates the grain, and when dry facilitates the removal of the husk. The heat is not sufficient to kill the enzymes or coagulate the proteids, but avoids the number of hours that are required to swell the grain by simple steeping in cold water. (iii) *Siddha* or parboiled rice is prepared by soaking the *paddy* in large vessels and then the water is brought up to the boil. The parboiling kills most of the enzymes, and coagulates the surface proteids in the grain. This parboiled rice is dried on platforms before it is husked. Rice from over-steeped *paddy* is dark in colour, and when overboiled is coarse in appearance, and in the milling it is often broken up into fragments. It will be seen that the better and medium grades of rice used for ceremonial purposes (*atap*) or otherwise (*balam*) are generally steeped in cold water or hot water respectively in order to preserve the enzymes of the grain and allow the seasoning processes to follow when the grain is properly stored. The medium and coarser grades are more often parboiled as it is easier to separate the husks.

(b) The removal of the husks may be carried out in two ways—(i) *Achatta*, by hand: this is generally done in the villages with a wooden pestle and mortar, or by it being beaten on a platform with a wooden beam (*dhenki*). The *paddy* is stored as such, and, when required, a small amount is taken out, say a 2 to 4 weeks' supply. The husks are prepared for removal, and the hand pounding leaves a good deal of the pericarp on the grain. During this process many of the grains are broken, and *atap* with entire grains sells at a higher price than the *siddha* or parboiled rice, although made from the same *paddy*. (ii) *Kalchatta* or machine removal is carried out where mills are available in the large towns. In the first place the hulls are removed by passing the grain through milling stones, screens, and winnowing machines. The kernels are then decorticated, and the outer cuticle with much of the gluten layer of the grain and the embryo are removed: this constitutes the rice bran or meal. This rice is known as unpolished rice.

(c) The polishing process is the final process which the grain undergoes. The polished grain is placed in rotating cylinders of wood and wire gauze, the surface of which is covered with soft tanned hide. In this process a film of gluten and starch cells is removed, and the fine powder thus obtained is technically called rice polishings: the polished grains are then screened in various grades and sizes.

These terms such as *atap*, *balam*, etc., are not the names of different rices but of various processes which the grain goes through before it arrives on the market.

We are now in a position to appreciate the fact that parboiled polished rice is the most dangerous type of process to subject rice to, because all the living cells and enzymes of the grain

have been killed by the heat, and the machine-milling and polishing has removed the embryo and the delicate starch cells, so that raw surfaces are exposed to the attack of bacteria and fungi. This rice, as we shall show later, when stored under favourable conditions of temperature and humidity is likely to become diseased, and so produce epidemic dropsy or beriberi. In villages the removal of the husk is facilitated by sun-drying or steeping, the husk is removed by hand, which leaves much of the pericarp and the whole of the gluten layer, only small quantities are prepared at a time so that a sufficient time is not allowed to elapse for gross invasion of the grain.

These factors all combine to explain the comparative immunity of the villagers to epidemic dropsy.

The seasoning of the rice.—Everyday experience has shown that new rice is indigestible, but if kept for some time—six months or more—the rice becomes more digestible and sweeter. Thus the rices can still further be subdivided into—

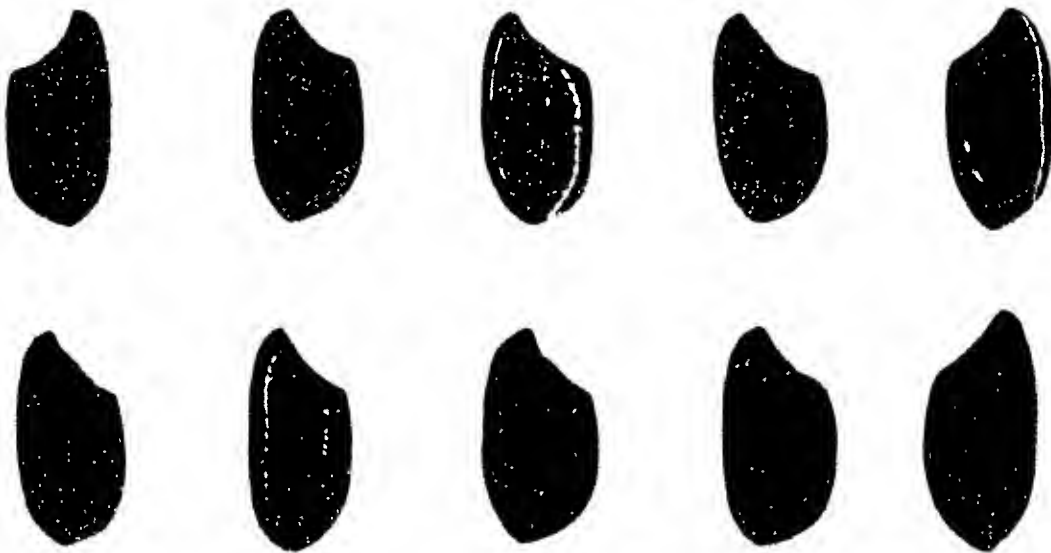
(a) New rice which is more indigestible, cheaper, and is the type usually eaten by the poorer classes and villagers. As a rule no preservatives are added and it is eaten soon after being turned out from the mills. Hence these diseases are not seen amongst persons eating this rice, as there is usually not sufficient time for it to get diseased. With imperfect storage in godowns or in transportation, this parboiled highly polished rice rapidly becomes diseased as no preservatives are added, and then beriberi is seen amongst those who consume the rice under these conditions.

(b) *Seasoned rice.*—The better classes demand a rice for one of its two qualities, (i) digestibility, (ii) sweetness. The seasoning of rice takes some months in storage to effect the hydrolysis of the insoluble proteids and carbohydrates into the more soluble proteoses, peptones and sugars. These characters are brought about mainly as the result of the hydrolysis of the proteids and carbohydrates by enzyme action. Such rices are either sun-dried or steeped and never parboiled, although they may be highly polished. Thus the Marwaris eat this rice mainly as *kher* (i.e., rice boiled in milk and eaten as a porridge) and so require the rice digestible and sweet, whilst the Bengalis and Mohammedans who eat their rice with *tarkari* or curry do not require it to be sweet, as the latter flavour would interfere with the high seasonings of the curry. Such rices are carefully selected and preserved from bacterial or fungal attack. Thus the middle grades of rice eaten by the Bengalis who suffer from epidemic dropsy are invariably parboiled and milled. As it is a cheaper grade proper preservatives are not added, so that the grain is very apt to get diseased if improperly stored.

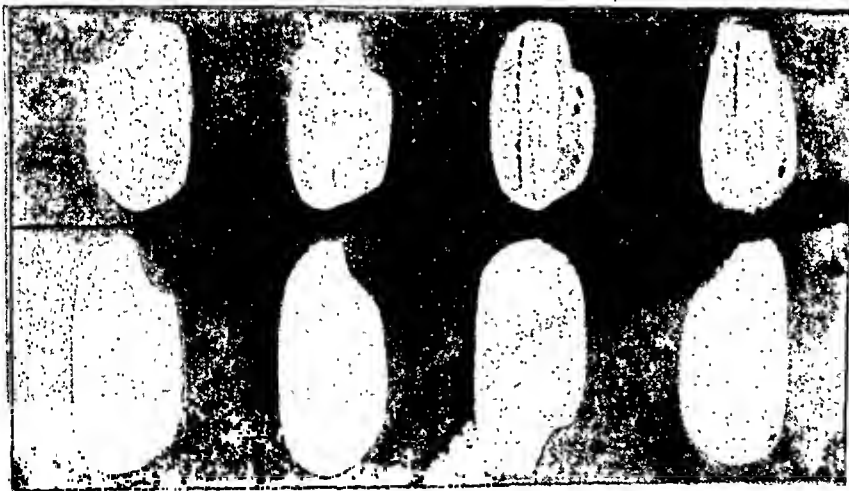
Chemical tests.—It is well known that the cheaper rices are more indigestible but sweeter, as has been shown by numerous analyses. To illustrate this point we selected two samples of healthy rice and submitted them to Dr. N. L. Bannerji for chemical analysis.

PLATE I.

Showing the appearance of healthy and diseased rice by the water test.



The five grains above are diseased Burma rice and the lower, healthy rice. In polished grain the attack may come from the surface.



Burma rice, healthy, yellow and horny in appearance.

Middle grades, waxy in appearance.

which he kindly carried out for us. The results were as follows:—

| Name of the Rice. | Kjeldahl. | Protein % = N X 6.25. | Amino N. * Van Slyke. | Crude Fibre. | Cane Sugar. | Reducing Sugar. |
|-------------------|-----------|-----------------------|-----------------------|--------------|-------------|-----------------|
| Burma Rice. | 1.001% | 6.25% | 0.935% | 0.63% | 0.08% | 0.02 |
| Dadkhani Rice. | 0.966% | 6.03% | 0.91% | 0.22% | nil | trace. |

* Van Slykes, estimation of amino nitrogen was performed after complete hydrolysis of the rice by means of 20 per cent. HCL and the solution was afterwards practically neutralised and acted upon by HNO₂ for 5 minutes with shaking.

It will, therefore, be seen that the Burma rice contains more crude fibre and more sugar than the dadkhani, a good grade rice.

DISEASED RICE.

When rice is infected with *Claviceps purpurea* the grain turns a black colour and the diseased grain can readily be made out. With rice on the other hand, the colour is not altered but the grain becomes opaque and this is not noticed by the ordinary individual. To detect this diseased rice the following tests have been employed by us:—

- (1) The water test.
- (2) Section of the grain.
- (3) The chemical separation of the water,—and alcohol-soluble bases.
- (4) Pharmacological tests.

(1) *Water test.*—(Plate I). Amongst people whose main food is rice, it is astonishing how few of them are able to recognise diseased rice. Amongst the various medical men to whom we have shown this test there was not a single individual, who had seen it used to test the condition of the rice. We are indebted to a rice merchant for showing us the test, which is employed by the trade. The test is simple enough, and consists merely of throwing a small quantity of the rice into a glass or brass dish, which contains water and then looking at the various characters and defects of the grain. If the grain is allowed to stand too long in the water, the fruit becomes swollen and opaque, but this takes some ten minutes or more, so that there is ample time to study the rice.

The first character to look at is the size of the grain; the coarser rices are short and plump, and the medium grains longer and thinner, whilst the best grains are generally rather long and fine. The coarser rices have a horny appearance, the medium and finer grades are waxy in appearance, and the longer the seasoning the more waxy is the character of the grain. Fruit that has been for a long time stored in the husk or over-steeped is often tinged with a yellow or reddish colour. Again one can easily see whether the rice has been polished or unpolished by the presence or absence of the sub-pericarpal layer.

(a) When the fruit is diseased the grain becomes absolutely opaque. In coarser rices the colour is slightly yellow, whilst the medium grains have a dead white plaster-like colour. In the polished rice, the invasion may be from the surface of the grain, or from the embryonic site. In parboiled unpolished rice the attack is usually from the embryonic side. The grain may be attacked by various fungi which will be described in detail later, but for the present we will only consider bacterial infection. This usually occurs from the embryonic site, or through injuries inflicted during the polishing processes of the grain. Under these conditions the disease of the grain is not so easily recognised unless this water test is used to demonstrate the increase in the opacity of the grain.

(b) Fungi attack the rice during the monsoon months of July, August, and September, when the temperature is lower but when there is a high humidity present which makes everything damp, e.g., leather gets attacked by a brown, yellow or black *Aspergillus*, the same happens to the rice grain if it is damp, and becomes yellow or brown in colour but the fungus does not invade the grain, and when the grain is attacked the rice merchants in order to avoid a loss repolish the rice. During this brushing process the grain, being more friable, is apt to break into small fragments or blocks, and these are technically known as brushings. The brushings are mixed with healthy grain, and sold to the public. This simple test tells us the character of the fruit, whether polished, unpolished, healthy or diseased, or whether it is mixed with brushings.

In all the cases where we have been able to test the rice actually eaten by the affected epidemic dropsy families, the larger portion of the grain has been attacked by this bacterial disease. In some families we failed to find any infection of rice, as they only bought small quantities at a time from the retail merchants.

In some samples of rice kindly sent to us by Major J. Jolly, I.M.S., from Burma suspected of producing beriberi in jail populations, one sample consisted of a medium grade rice which was unpolished, but was extensively adulterated with diseased coarse grain Burma rice; the other samples were Burma rices in which almost every grain was found to be diseased.

(2) *Sections of the rice with white opaque grains.* show a liquefaction of the starch cells (Plate II). This liquefaction may commence from the surface in polished grains or from the embryonic site. It is, however, necessary to differentiate this from the burrows of the larvae of weevils. When the grains are badly diseased, the rice can be crushed up into a fine powder by the fingers. In future we will speak of such grains as diseased rice, and where no such change can be seen as healthy rice.

(3) *Chemical separation of the bases from diseased rice.* In every experiment we carried out on diseased rices, we used the water test to

see whether the grains were really diseased or not, and the rice was always obtained from the actual food supply of infected patients. We also tested a sample that was obtained in the market similar in quality, but not showing disease by the water test: this acted as our healthy rice bases, i.e., as control. In cases where we obtained rice which appeared quite healthy and obtained from persons suffering from epidemic dropsy, we found that the original stock had been exhausted and this sample was from a new source of supply. During the last three years of experience on the extrac-

in a litre of water and kept overnight in the cold room at 4°C. Next day it is filtered and treated with the same bulk of water and this is repeated three times, the filtrates being kept in the cold room to prevent bacterial changes. A sufficient quantity of sulphuric acid is added to the total filtrates to make it a 5 per cent. solution. The bases are next precipitated with phospho-tungstic acid and filtered. The precipitate is washed and dissolved in diluted acetone (two parts of acetone to 3 parts of water) and then decomposed by baryta water and filtered. The barium is removed from the filtrate by CO_2 , and finally any trace is precipitated by a few drops of sulphuric acid. The solution is then filtered and neutralised by dilute sodium carbonate. Then evaporated to dryness under vacuo. This constitutes the total

PLATE II.



(1) Microphotograph of a section of a diseased rice grain—showing the area of liquefaction.

tion of these bases from diseased rices, our chemists—Mr. N. R. Chatterji, M.Sc. and Mr. A. T. Dutt, B.Sc.—now employ the following processes, and we may here take the opportunity to express our thanks for all the work and energy they have expended on this research. Without their co-operation we would have been still in the blind stages of feeding animals on polished and unpolished rices.

The bases extracted can be divided into two categories—

- (a) Water-soluble bases.
- (b) Alcohol-soluble bases.

(a) *The water-soluble bases* were extracted as follows:—One kilo of coarsely powdered rice is soaked

water-soluble bases from epidemic dropsy or beriberi diseased rices.

The total bases are then fractionated in the following ways:—

(i) They are dissolved in weak sulphuric acid, and precipitated by silver nitrate. This precipitate constitutes the purine fraction and the silver is removed by dilute hydrochloric acid.

(ii) The filtrate from the purine fraction is treated by an excess of silver nitrate and a few drops of baryta added when a brown precipitate occurs, the histidine fraction. The metals are removed from the precipitate by hydrochloric and sulphuric acid.

(iii) The filtrate from the above is now treated by an excess of baryta and a further precipitate occurs, "the argentine fraction." The barium is removed by sulphuric acid.

(iv) The solution from the above is made free from barium by blowing CO_2 through the solution and then

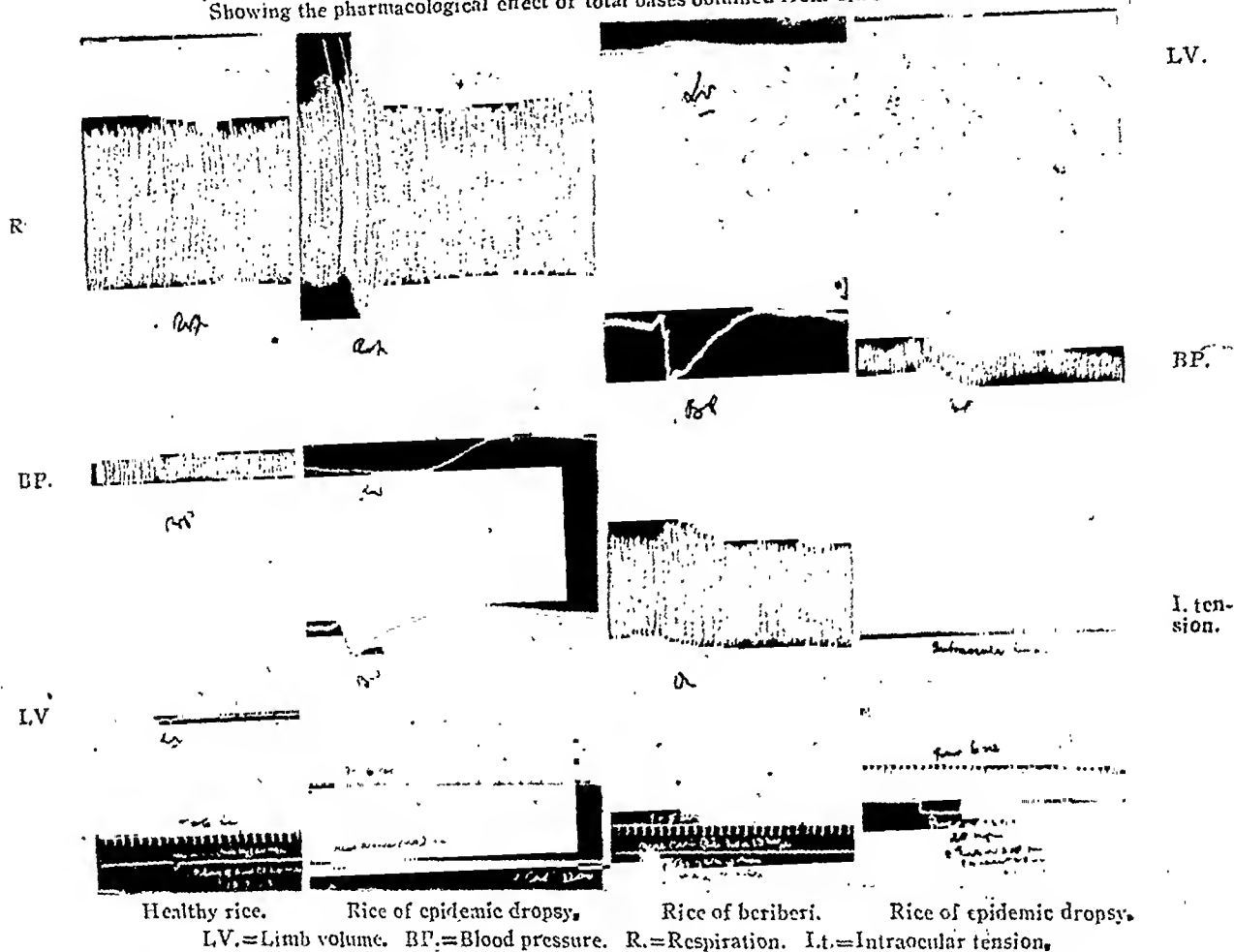
by a few drops of dilute sulphuric acid, and any trace of silver by hydrochloric acid. The filtrate is evaporated to dryness in a vacuum, "the lysine fraction."

(b) *The alcohol-soluble bases.* The crushed rice was soaked with rectified spirit in a percolator for 48 hours. The extract was then drawn off and the alcohol recovered by distillation. The residue was extracted

kindly examined ophthalmoscopically six cases, that were recently under our care, noticed marked cupping of the disc in all the cases. Graph V shows the effect of the lysin fraction of the bases of beriberi rice on the excised heart of a rabbit. There is at first a very marked augmen-

GRAPH IV.

Showing the pharmacological effect of total bases obtained from different rices.



with petroleum-ether to remove fats and oily matter. Then rubbed in a mortar with absolute alcohol and was then filtered, and the alcohol removed by evaporation. The residue was dissolved in dilute phosphoric acid and utilized for tests.

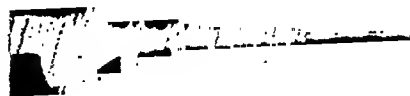
These bases were then submitted to pharmacological tests.

(4) *Pharmacological tests.*—Graph IV shows the effects pharmacologically obtained from the total water-soluble bases of the different rices: (i) From healthy rice there is no effect seen. (ii) With the bases from epidemic dropsy rice, showing marked bronchial constriction, a slight fall in blood pressure followed by recovery, but the important point to notice is that there is a marked rise in limb volume which is delayed and is not due to a vascular dilatation. (iii) Shows the effect of the bases from beriberi rice; here the bronchial constriction is much less marked, and the limb volume rises only as a result of the general vaso-dilation, which is consequent on the fall of blood pressure. (iv) The intra-ocular tension with the bases from epidemic dropsy rice (shows a slight rise). Colonel Coppinger who

tation of the heart beat, which is soon followed by a diminution of the beat, and in a very short time the heart almost ceases beating.

GRAPH V.

Showing the effect of the bases from the lysin fraction (beriberi) on the isolated heart.



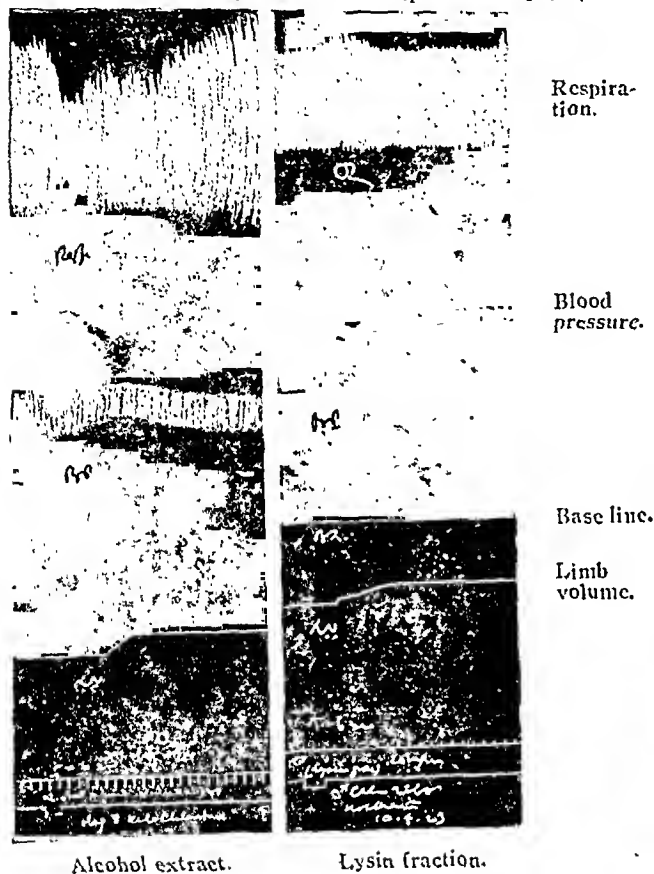
Lysin fraction (beriberi rice).

Graph VI shows the effect of the alcohol extract of epidemic dropsy rice. In the alcoholic extract there is a bronchial relaxor, which causes a great augmentation of the heart beat; the limb volume

risers and remains raised for some time. The lysin fraction of the water-soluble bases contains a substance which causes bronchial constriction, a marked rise of blood pressure which is sustained, and a rise in limb volume following more slowly after the rise in blood pressure.

GRAPH VI.

The alcohol and lysin fraction of epidemic dropsy rice.



Graph VII shows the effect of the bases obtained from beriberi rices. (a) Shows the effect of the histidine fraction: here we have a bronchial constriction effect, a fall of blood pressure, and no alteration in limb volume. (b) Shows the effect of the lysin fraction: here there is a very marked and sustained rise of blood pressure, a marked relaxation of the bronchial muscle, a marked rise in intestinal volume and movement: in spite of the rise in blood pressure, the limb volume is not altered. (c) Shows the normal effect of pilocarpine on blood pressure and respiration, i.e., a fall of blood pressure and bronchial constriction. The bases obtained from the alcoholic extract of beriberi rice completely inhibit the effect of pilocarpine.

We have therefore in these rices the following pharmacologically active bases. The total water-soluble bases from epidemic dropsy rice produce bronchial constriction and a rise in limb volume and this effect is not seen with the water-soluble bases from beriberi rice.

In the water-soluble fractions the active bases are as follows:—

(a) Histidine fraction, more marked in epidemic dropsy rice, a substance like histamine which causes a fall of blood pressure and marked bronchial constriction.

(b) Lysin fraction, more marked in beriberi rice; a very powerful base which causes a rise of blood pressure, bronchial relaxation and on the excised heart, first stimulates and then arrests the heart beat.

In epidemic dropsy rice there is no bronchial relaxation and there is a rise in limb volume.

In the alcohol-soluble bases:—

(a) Epidemic dropsy rice bases augment the heart beat, cause bronchial relaxation and a rise in limb volume.

(b) In beriberi rice there is no effect on respiration or blood pressure, but paralysis of the parasympathetic as shown by the blocking of the normal action of pilocarpine.

You can now realise our first difficulty when we had these varying reactions to contend with in these diseased rices, as we had not realised the difference in their end-decomposition products. These bases are sufficient to explain the neuritis, gastro-intestinal, cardiac, and other symptoms of the two grades of rice; epidemic dropsy rice has more water-soluble bases producing oedema, whereas beriberi rice has more of the neurotoxin.

THE CAUSES OF DISEASE IN THE RICES CONCERNED.

We have already seen how the milling and polishing processes damage the grain and render it liable to attack at the embryonic site and from the surface when the rice is highly polished (*see* Plate I). There is another factor that sometimes helps in the disease of these grains, and that is the infestation of the rice by the larvae of various weevils and moths.

To show the cause of the disease in the grain we adopted the following methods of investigation:—

(i) *Sections of the grain.*—The technique which we adopted was one of these two methods.

In the first, the grain was boiled in a 3 per cent. acetic acid for a few minutes, then put into acetone for $\frac{1}{2}$ to 1 hour, dried, and then put into an aqueous solution of glycerine and kept in the incubator for 3 or 4 days until the rice grains were sufficiently softened for sectioning, transferred direct into the paraffin bath for 2 hours, and then cut. In the second method, the grains were put into cellulose acetate in acetic acid overnight, washed in dilute acetic acid and then in water for half an hour, transferred into 50 per cent. alcohol for 1 hour, then into absolute alcohol for 1 hour and finally to the paraffin bath for 2 hours.

Sections were cut and stained by Möller's method for spores, and counter-stained with Manson's methylene blue. We are indebted to Dr. S. Bose, Botanist of the Carmichael Hospital, Belgachia, for showing us the technique for cutting these grains of rice.

Sections of the diseased grain showed the constant appearance of spores and less commonly of bacilli inside the rice grains (*see* Plate III). Occasionally we encountered a smut of which the spores were seen at the surface of the grain.

(ii) *Cultures from the diseased grain.*—The technique adopted by us was to immerse the rice grain for

half an hour in pure carbolic acid in order to sterilise the surface. The carbolic acid was washed away by absolute alcohol, and the alcohol removed by sterile water. The grain was then broken into two, and planted with the broken surface downwards on agar, and a growth obtained of a spore-forming aerobe. No growth occurred when an unbroken rice grain thus treated was placed on the agar; showing that the bacilli were lying inside the grain. We found that boiling in 40 per cent. formaldehyde solution at 58°C. under vacuo sterilised the whole grain; the same happens when 1 in 1000 HgCl. solution is used.

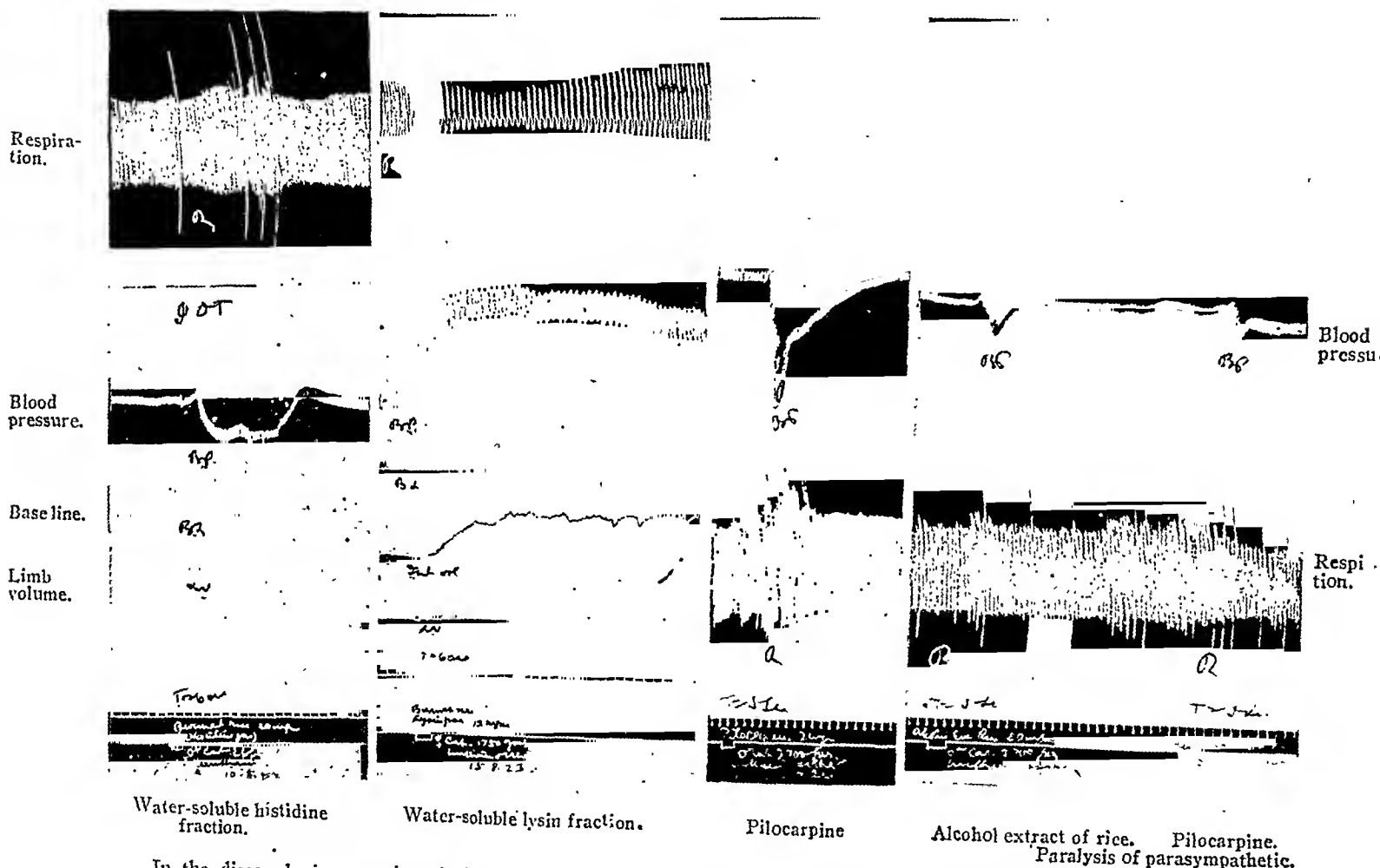
(iii) We next ground up both healthy and diseased rices and the flour from these rices on an agar plate.

and at 50°C. It therefore appeared to be a facultative anaerobe as well as a thermophilic bacterium.

Colonel Harvey, I.M.S., has directed our attention to the possibility of its living in symbiosis with an anaerobe and we are very grateful to him for this suggestion. But at present we have not been able to verify this point by growing the organism from a single bacillus. On agar it forms a white dry wrinkled growth, and on potato a copious white growth. On serum agar it forms a white wrinkled growth and in 2 to 3 days the medium becomes liquefied; until finally the whole slope is digested. Gelatine stab cultures show a marked area of liquefaction. Solid rice media is liquefied in 2 to 3 days. Litmus milk at first turns acid and then white,

GRAPH VII.

Rice eaten by persons suffering from beriberi—the fractions obtained from the water- and alcohol-soluble.



In the diseased rices we invariably found the presence of a bacillus of the *vulgatus* group which we will describe in detail later. In the healthy rice this bacillus was also very frequently encountered. Besides these bacilli, we almost invariably grew colonies of *Aspergillus* of green, white, brown and less commonly of the black variety; a *Rhizopus*, probably *oryzae*, was less frequently seen, and still rarer a *Mucor*. In all the plates there were numerous colonies of yeasts.

The organism isolated had the following characters.—It was a bacillus about 2.7μ long and 1μ broad with rounded ends. It was a spore former; the spore was central in position and did not bulge the sporangium. It was a Gram positive organism, and stained well with all aniline dyes. The spores retained the stain well by Möller's method.

Cultural characters.—It grew well in the presence of air as well as under anaerobic conditions, at blood heat,

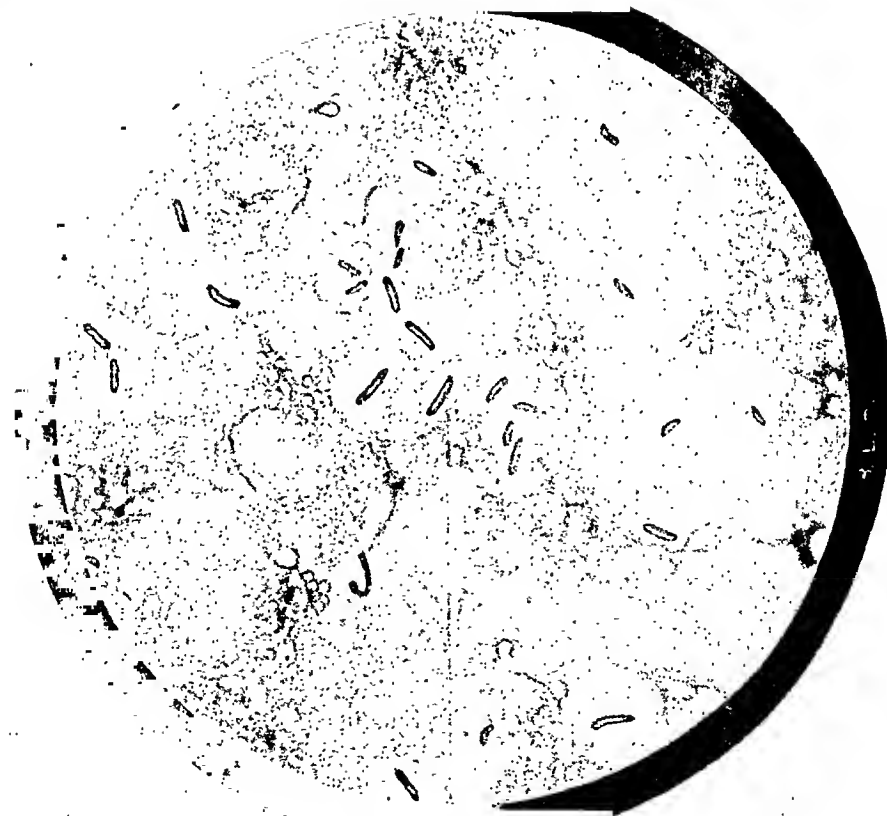
owing to the formation of leucobases, and finally the casein is digested.

Sugar reactions.—No change in lactose and dulcitol, but glucose, saccharose and mannite are made acid and then the litmus is converted into leucobases.

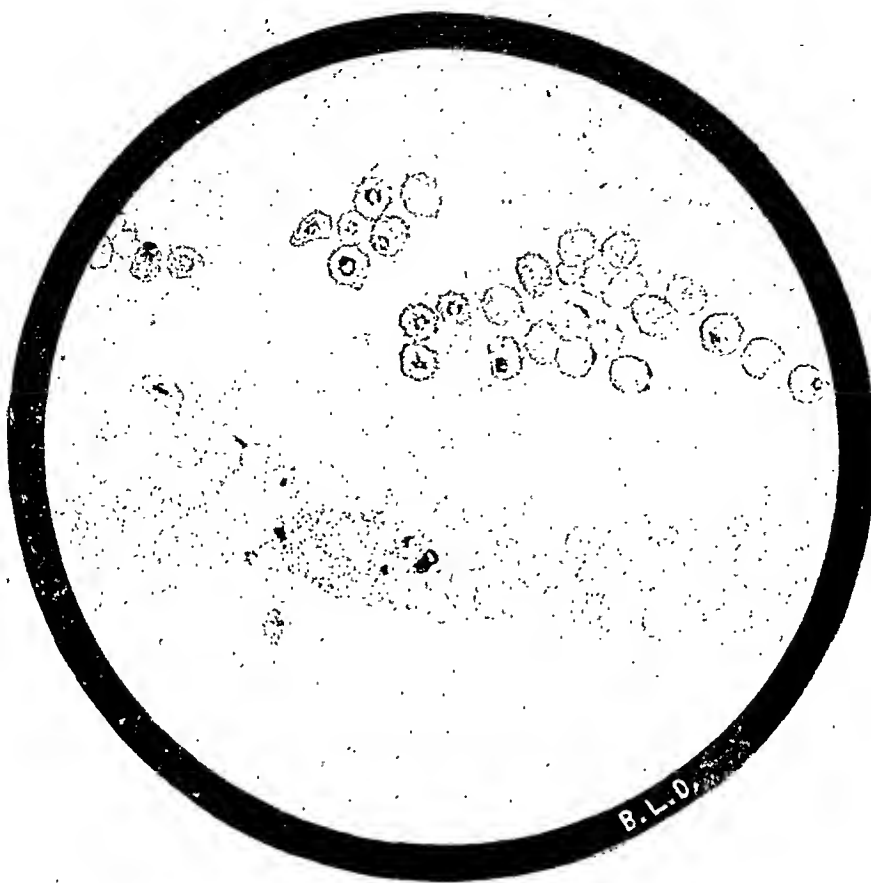
Relation to heat and chemicals.—Infected rice when boiled in sterile water for $1\frac{1}{2}$ hour, and then inoculated on agar plates gives the characteristic growth of this bacillus, showing that the spores are not killed during cooking of the rice. The spores require a temperature of 115°C. for 10 minutes to be destroyed.

We have therefore an organism of the genus *Bacillus* belonging to the *vulgatus* group, which is found both in healthy and diseased rice, but it is present only inside the grain in diseased rice, and not in the interior of the grain of healthy rice. It happens to have an intense proteolytic.

PLATE III.



Showing the bacteria in the liquefied area stained with methylene blue.



Section of the grain stained with carbolfuchsin showing the spores of a smut.

action, and is therefore capable of producing various decomposition products from the proteins of the rice grains. What we desire to make perfectly clear is that we do not claim specificity for this organism. What we have found is that the organism has been demonstrated inside diseased rice grains, and that it has an intense proteolytic action on rice proteids. Whether it is the *only* organism of this large group of spore-forming aerobes that can attack the grain and produce these poisonous bases, we are not in a position to state definitely. In agricultural bacteriology, many of the decomposition processes are commenced by aerobes and completed by anaerobes; whether such a symbiosis exists in the rice decomposition we as yet have not been able to discover.

FACTORS INFLUENCING INFECTION OF RICE.

The rice merchants well know that rice is very apt to decompose in one of these two ways, depending on the moisture present in the grain—(a) If the grain has its ordinary moisture, it may become white and opaque, or (b) if it has been damped with rain, bilge water, etc., it is apt to become mouldy. The season of the year which is most favourable is during the monsoon months. If we study the meteorological conditions during this period, the results are shown in the following table:—

| Month of year. | Air temp. °F. | Daily variations in air temp. °F. | Wet bulb °F. | Humidity %. |
|----------------|---------------|-----------------------------------|--------------|-------------|
| May .. | 85.7 | 18.4 | 78.9 | 75 |
| June .. | 84.5 | 10.4 | 79.0 | 83 |
| July .. | 83.0 | 9.6 | 80.0 | 87 |
| August .. | 82.4 | 9.2 | 79.5 | 88 |
| September .. | 82.6 | 9.0 | 78.8 | 86 |
| October .. | 80.0 | 13.2 | 73.3 | 82 |
| November .. | 72.4 | 18.3 | 65.0 | 74 |

It will be seen that the most dangerous months are those of July, August and September, when the mean air temperature ranges between 82.4 and 83°F with an almost constant daily variation of 9°F and the humidity ranges between 86 and 88 per cent. saturation. This keeps the wet bulb temperature constant during the day and night between 78.8° and 80°F. The following experiments were devised by us to prove this point.

(a) Pre-monsoon period, during May and June when the air temperature was about 85°F with a daily variation between 12 and 18°F and the humidity about 75 to 78 per cent. saturation. Selected healthy rice was lightly sprayed with cultures of this *vulgatus* bacillus, and placed in glass dishes 4" deep. One set was exposed to the air temperature and remained healthy, the other set was placed in a galvanised tank containing about 1" depth of water and covered with a thick glass plate. The air here was well saturated and in a week's time every grain of the rice was attacked by this bacterial disease. From this diseased rice we were able to

separate out the water-soluble bases in the histidine and lysin fraction and also the base that cause oedema.

(b) Monsoon-period, during July to September, when the humidity ranged between 86 to 88 per cent. of saturation. Of the rice trays exposed in the laboratory after spraying, all were affected by this bacterial disease. But on the other hand, the trays in the water tank were rapidly attacked by fungi, *Aspergillus*, *Mucor* and *Rhizopus*; these fungi did not invade the grain but altered its colour from a black to yellow, in a short time the grain became sodden and one could detect the odour of alcohol from the yeast fermentation.

(c) Post-monsoon, end of October and November, when the humidity had fallen to 82 to 74 per cent. of saturation. The rice in the trays in the laboratory remained healthy, but the ones in the saturated atmosphere were moderately attacked by this bacterial disease.

We, therefore, see that the main factors in causing this bacterial disease of rice are the constant high wet-bulb temperature day and night, only varying between 78.8 and 80°F in the 24 hours, and the intense humidity of the air between 86 to 88 per cent. of saturation.

THE ARTIFICIAL PRODUCTION OF THESE BASES.

Until we could produce the various bases under artificial conditions we were not in a position to be certain of our results of this investigation:—

From cultures of the rice which had been artificially diseased by spraying it with this organism, and then keeping it under suitable conditions of temperature and humidity, we were able to separate these various crude bases. This test was not however sufficient, as we could not exclude the various other organisms that may have been present in the so-called healthy rice. In order to prove this point, we prepared rice media as follows:—

250 grammes of rice flour, made from medium grades and coarse grades of rice, were boiled for 1 hour in a litre of water. The volume was adjusted to 1 litre, autoclaved for 20 minutes at 115°C. to kill the spores, and then incubated for 2 days at 37.5°C. to prove that they were sterile. Uninoculated flasks were then incubated and kept as controls. The inoculated flasks were inseminated with this bacillus of the *vulgatus* group, and grown aerobically at 37°C. for 10 days. During the incubation the rice media which was solid to commence with was gradually liquefied; and by the third or fourth day was quite fluid. The controls and incubated flasks were treated chemically and the water-soluble bases extracted from them.

The results are shown in Graph VIII. We may point out that this graph is not the result of one observation but of several observations. We have been working on this disease since 1922, and these graphs are the selected results of three years of hard work. The first portion shows the results of 20 mgms. of bases from the uninoculated control. The second portion shows the effect of the bases isolated from inoculated medium grade rice. Here there is seen a histamine-like

effect, marked bronchial constriction and a fall of blood pressure without any augmentation of the heart beat. In the third portion, an inoculated rice of a coarse grade, here the fraction in the lysin portion is more apparent, there is a marked fall of blood pressure but it is rapidly recovered from; the heart beat is augmented and there is marked bronchial relaxation.

Artificially we were able to produce the same toxins in the histidine and lysin fractions. For a long time however we were unable to produce the neurotoxin that paralysed the para-sympathetic because time after time these attempts failed under aerobic conditions. We then changed the

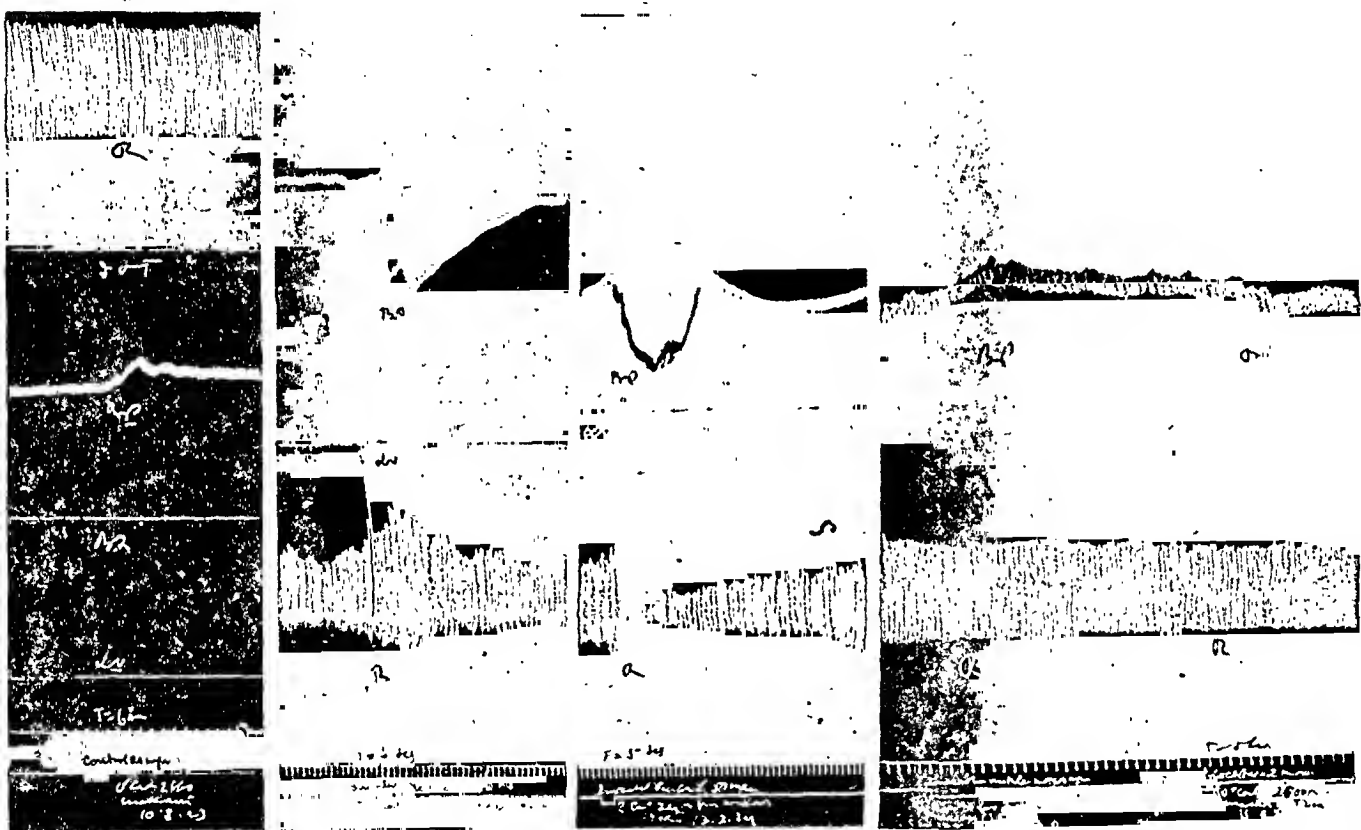
We have therefore been able to produce artificially the bases present in the histidine, lysin and alcohol-soluble fractions in sterile rice media artificially inoculated with cultures of the same bacillus, isolated from diseased rice. Further, they produce similar results upon inoculation into experimented animals.

INDIVIDUAL SUSCEPTIBILITY.

The third difficulty which we encountered during this work was the question of the individual susceptibility of our animals. For a long time we were extremely puzzled to find dissimilar results from the same sample of rice base; one day it would produce a very good effect from our

GRAPH VIII.

Shows the pharmacological effects of the total bases obtained from artificially inoculated rices.



Healthy rice bases.

Inoculated rice bases.

Rice media aerobic.

Alcohol extract.
Anaerobic rice culture.

Pilocarpine.

conditions, as soon as we realised the high temperature and anaerobic conditions produced in rice that was decomposing in storage. The flasks were inoculated with the same bacillus and grown aerobically at 37.5°C. for three days until the medium was completely liquified, then the surface was covered with sterile vaseline and incubated at 50°C. for seven days. The alcohol-soluble bases were then extracted from the controls and inoculated rice. The fourth portion of this graph shows the presence of a neurotoxin in the alcohol fraction, and it is able to completely block the action of two milligrammes of pilocarpine.

point of view, whilst if tested to-morrow on another animal the same base would be almost devoid of effect. At first we were inclined to look upon these variations as due to alterations in the processes of extraction employed by the chemist, or to deterioration by light, etc., until one day we decided to test two animals simultaneously; when in one we got a very marked effect, whereas in the other the bases were almost devoid of action. This experiment showed that we were dealing with some individual factor in our animals, and this lead us to investigate these individual peculiarities. The results are embodied in a paper by Acton and Chopra (1924).

There are two primary factors involved in toxicity; (1) the amount of poison ingested; (2) the variations in the internal defence mechanism, on which to a large extent depends the production of symptoms. Thus if the amount of poison be large in amount all the individuals involved will be poisoned; e.g., the incidence of epidemic dropsy in a family where every member is attacked; this is purely a question of toxicity. But in a jail population, where only a few prisoners are attacked and where the whole population is eating an identical diet, we are dealing with the susceptibility of the individual, as the dose of poison ingested must be just under toxic limits for normal individuals. When we investigated what constituted this susceptibility, we found it was a very complicated mechanism, which was associated, firstly with the rate of absorption of the poisons from the intestine, then with the defence mechanism of the liver, which dealt with a certain amount of these poisons, and so regulated the concentration in the circulating blood.

Before the poisons can act on the different tissues their rate of diffusion into the tissues is regulated largely by the endocrine secretions. Thus conditions of hypo-adrenia and hypo-thyroidism are favourable for these toxins to exert their maximum effect. The converse condition of hyper-function of these two glands prevents these bases from acting on the tissues. When conditions of susceptibility are favourable large doses will cause the death of these individuals and smaller doses will produce symptoms in them, whereas normal individuals under similar circumstances will either not die, or escape the disease. During the course of our snake venom experiments, Acton and Knowles (1914) noticed that susceptibility was closely correlated with the colour of our animals, i.e., white goats were more susceptible to cobra venom than black goats. Again Bose and Acton (1924) showed that black rabbits showed a greater reduction of blood sugar after injection of insulin than white rabbits, and this in its turn was associated with the amount of adrenalin present in these animals. We are extending these observations to the action of these bases, toxins, etc., the results of which will be published by us in a separate paper shortly. In Graph IX we see graphically how important is this association. In the upper graph is the record of blood pressure and respiration of a white rabbit; we see that $\frac{1}{10}$ of a c.c. of 1 in 1000 adrenalin raises the blood pressure from 70 mm. to 180 mm., whilst tyramine and pilocarpine have lost their characteristic effects on the blood pressure and particularly on respiration. The lower graph shows a similar record made on a brown "Belgian hare" rabbit; here we noticed that the adrenalin effect is much less marked, as the blood pressure is raised from about 85 mm. only to 130 mm. whilst tyramine and pilocarpine have their characteristic effects both on the blood pressure and respiration.

It is therefore apparent that if one tested these rice bases on a light-coloured animal with a high

adrenalin content, the effects would not be at all characteristic, whilst typical effects would be seen in dark-coloured animals with a low adrenalin content. These effects were very puzzling to us in the earlier days of this research when we were groping to find our way out through this maze of difficulties. Now, however, we know that when an animal—usually a dark-coloured one—gives a poor adrenalin response, the action of the bases to be tested will be typical. McCarrison in 1924 did not realise this factor when he was endeavouring to explain why the birds in his different experiments gave a different percentage of infection.

THE ROLE OF THE VITAMINES.

The work that has already been done on this subject is too sound to neglect, and for us to consider only the poisonous bases found in diseased rice. On the other hand we rather suspect that we are dealing with a partial association; that beriberi is caused by these poisons in the rice, but that their action can be antagonised by the vitamins in various ways which we will discuss presently. The experimental work on the value of vitamins in beriberi has largely been done on birds; pigeons, fowls, etc., which have been fed on polished and unpolished rice. Megaw (1923) showed from the post-mortem lesions, that avian and human beriberi were not identical diseases, as in the former atrophy of the heart occurred and in the latter hypertrophy and dilatation. Another point against these bird experiments is the fact that the proper food for them is seed or grain unhusked with plenty of grit in order to allow the gizzard to thoroughly powder the grain and prepare it for the digestive juices further down the alimentary canal. Now a bird kept penned in a cage without any access to grit, and fed only on polished rice is unable to finely grind up the rice, and must suffer from the effects of this lack of mechanical digestive process. Further it is not necessary to give diseased rice, for ordinary healthy polished rice will cause avian beriberi. These facts will combine to point out that avian beriberi is a disease due to the formation of poisonous bases formed from the rice in the alimentary canal of these birds, due to the result of the imperfect grinding of the rice in the gizzard, and possibly to the altered bacterial flora as the result of this indigestion. We have heard that a French worker Marchoux, (1920) in Indo-China is working on these lines, and considers that beriberi is an intestinal infection and the poisons are formed in the intestine, which would be quite possible in avian beriberi.

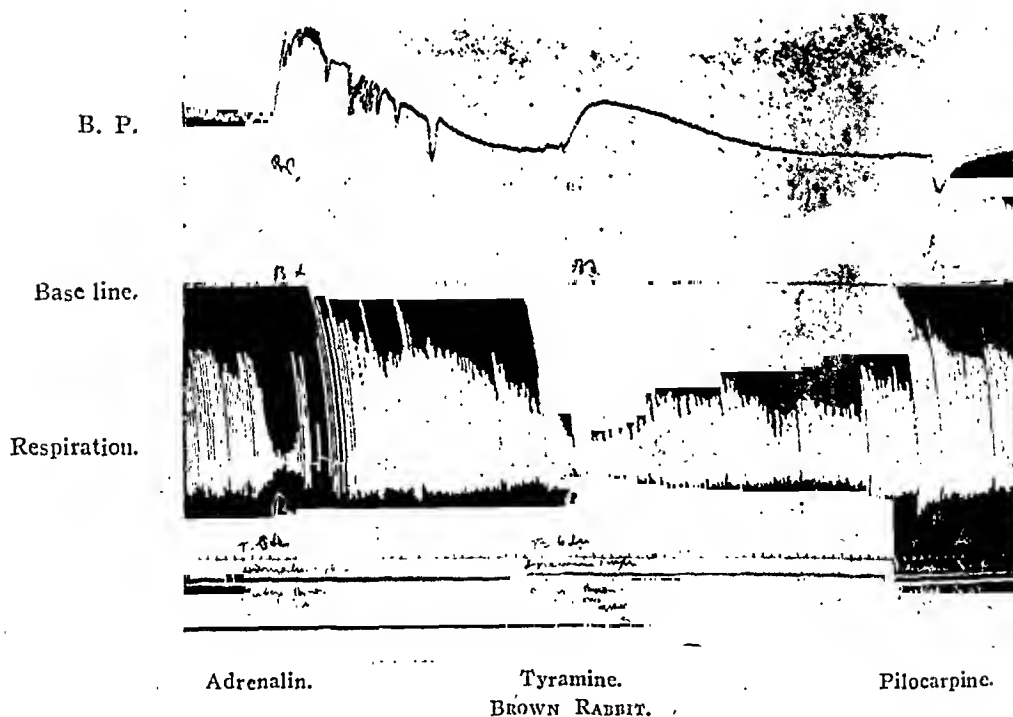
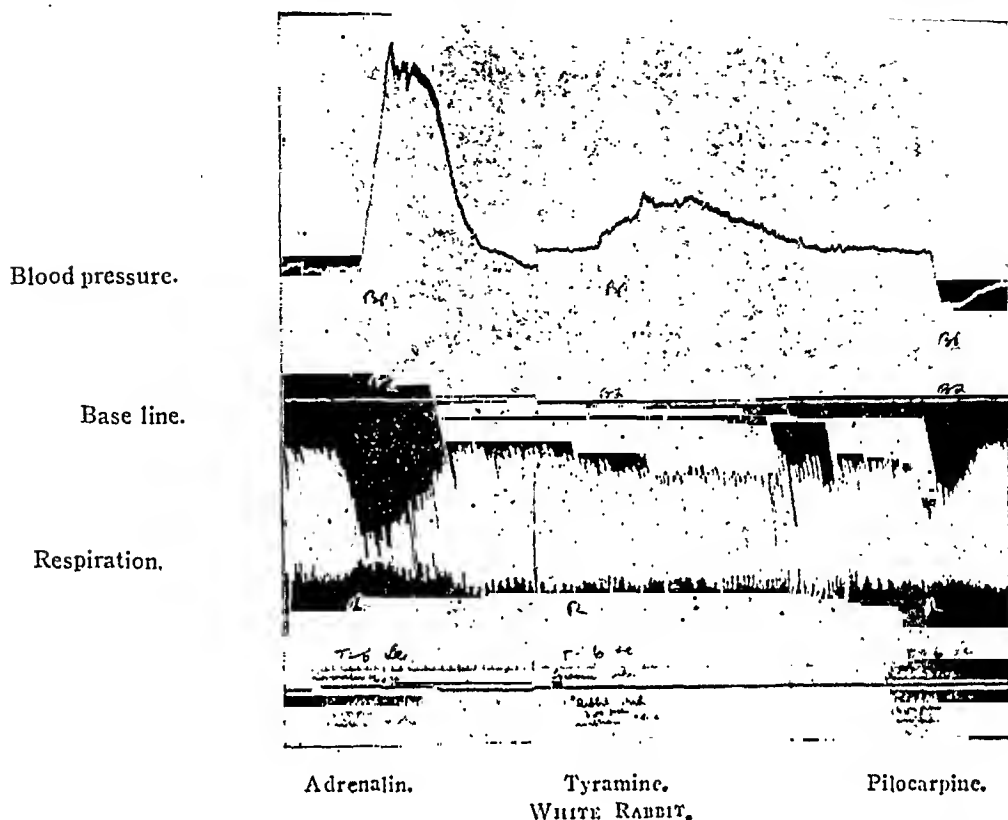
We will now consider the rôle that the vitamins play in this disease. Sajous first hinted that one of the functions of the vitamins was to supply the precursors for the various endocrine secretions: this must be a pure surmise until the chemical composition of these antagonistic substances is known to us. We

extracted the water-soluble bases from rice bran and tested them pharmacologically; see Graph X. This experiment was performed on cats; in one the total water-soluble bases

an increase in the force and amplitude of the heart beat; and a tendency to a fall in the limb volume, results which are distinctly antagonistic to the poisons in the rice.

GRAPH IX.

Showing the relationship of colour to the intensity of action to certain bases.



were tested, and here there is marked bronchial relaxation, a rise of blood pressure with

In the second experiment, the bases were separated into the four amino-acid fractions,

and in the lysin fraction a very powerful base was found which acts on the bronchiole muscles and blood pressure, and in spite of the high rise in blood pressure the limb volume was not altered at all.

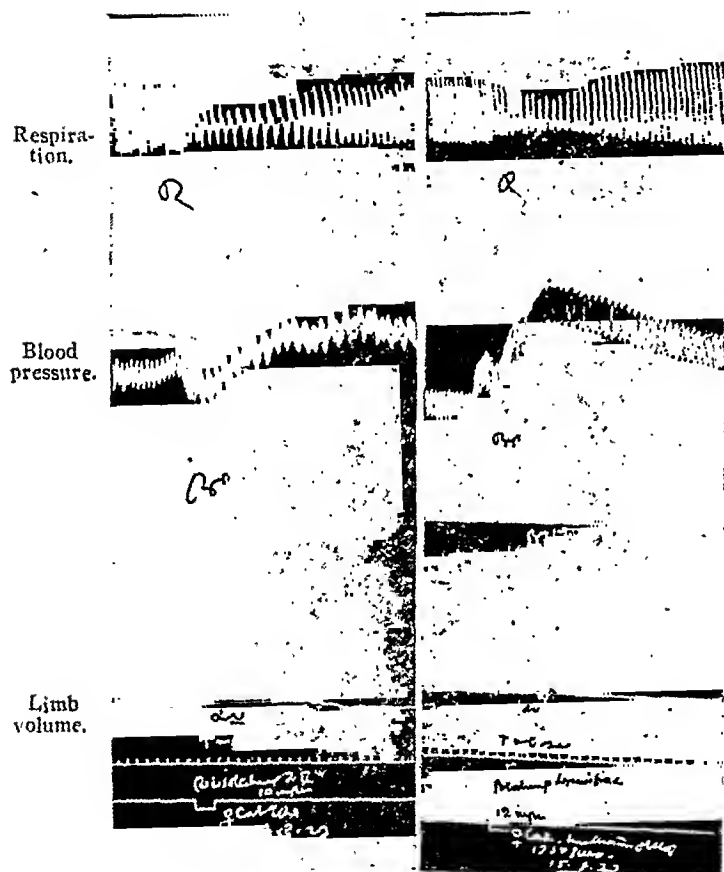
We therefore see that the pericarp of the rice acts in four different ways—

(i) Mechanically, by being impervious only to water and protecting the grain from invasion by extraneous bacteria and fungi.

(ii) The protective layer of bacteria. Professor Fowler of Bangalore has shown that in all seeds there is a layer of bacteria, specific for the particular plants concerned, situated in the space between the pericarp and aleu-

GRAPH X.

Showing the pharmacological effect of the bases obtained from rice polishings.



Total bases rice polishings. Lysin fraction rice polishings.

rone layer, and surrounding the whole grain. These bacteria prevent the ingress of extraneous bacteria that may possibly occur when the embryo ruptures the thinned out pericarpal layer over the embryonic site, during germination, and probably accounts for the increase in the vitamine content of germinating grain—compare hordenine in barley.

(iii) By virtue of these antagonistic water-soluble bases, anti-beriberi vitamins that are probably produced as the result of this bacterial action in healthy grain, especially if the

bacteria are rapidly multiplying during germination.

(iv) In birds the husks and pericarp are required for the mechanical grinding that occurs in the gizzard.

Whether these vitamins are the sources of supply of such essential endocrine secretions as adrenalin, thyroxin, etc., remains to be proved as yet. But there is little doubt that with starvation or malnutrition all these secretions are diminished, and with a liberal diet of fresh foods, these secretions are brought up to the normal limits of health. The essential factor for the production of beriberi or epidemic dropsy is the presence of toxins in diseased rice, the pericarp and its vitamins preventing these diseases either by preventing disease of the grain, or by virtue of the antagonistic substances present, or produced in the body.

FEEDING EXPERIMENTS ON MONKEYS.

The lack of animal accommodation that we suffer from at this School, and the difficulty of obtaining a sufficient quantity of the diseased rice prevented us from carrying out any large series of feeding experiments.

(a) Two monkeys were fed on boiled rice from a specimen of rice obtained from an epidemic dropsy case. The water was dried by cooking. Both monkeys developed diarrhoea in 8 days and showed signs of anæmia on the 15th day. Oedema of the feet commenced on the 19th day, and on the 29th day one monkey showed distinct puffiness of the face and oedema of the wrists and feet; the other only showed the oedema of the feet. The experiment had to cease on the 41st day, as the rice supply gave out. These two monkeys were given two bananas each day with their feeds in order to supply vitamins.

(b) Two monkeys were fed on the same rice as (a) but the rice was well washed after the rice water had been thrown away. Two bananas were given to each daily. These two monkeys only showed diarrhoea on the 11th day, which soon passed off. They remained healthy till the feeding was stopped on the 41st day.

(c) Two monkeys were given boiled new rice with two bananas; they remained healthy up to the 41st day.

This small experiment means very little by itself, but it confirms our view that most of the poisons concerned with the production of symptoms in epidemic dropsy diseased rice are water-soluble, and the disease could be avoided to a large extent by washing the rice well after throwing away the *kanji* water.

TREATMENT OF THE DISEASE.

The first point we have to consider under this heading is the means which we can take to prevent these two diseases.

(i) *The use of the water test in areas where these diseases occur.*—It is an extraordinary fact that most of the foodstuffs eaten by man are seen or selected by women, yet how few of them know the quality of the foods they buy for their households. With European women, if it was not for the fact that meat was stamped 1st or 2nd class, not one in ten would be able to judge for themselves the quality of the meat their cook brings each morning. The same applies to the rice, the staple article of diet in Bengal; we can now recognise diseased rice without the water test, but doubt whether we would ever have discovered it without first being shown the test by a rice merchant. (By this test we can more accurately judge the quality, the amount of disease, and the presence or absence of brushings. In this way people could avoid buying rice that is dangerous to health.) For legislative measures on this subject, one should have the additional safeguard of chemical, and pharmacological tests.

(ii) *Proper Preservation.*—The public demand a highly polished rice, as it looks nicer, whilst the miller prefers parboiling as it is easier to separate the husks, so that the common rice in most markets is a parboiled highly polished rice, i.e., a nice looking rice which is cheap. The grain has been preserved as the result of past experience by the following methods:—

(a) The cheapest grades are usually not protected at all, but sometimes a little chalk is added to increase the white colour, and more rarely rice bran is added as well. All these rices are parboiled and polished.

(b) The medium grades, were in former days usually steeped and hand husked, but are now largely parboiled and always machine milled.

To each 60 lbs. of rice one lb. of rice flour and 4 oz. of lime is added as a preservative. The lime keeps the rice dry and prevents the excessive hydrolysis of proteids and any further hydrolysis of sugars by yeasts into alcohol, etc., as both organisms require a good deal of moisture. Many fungi require a minimum amount of moisture and so the hydrolysis of starches into sugars is attained by the addition of lime. The coarser grained rices have the highest sugar content, so the Marwari selects the cheapest grade of rice and has it seasoned by lime to meet his requirements at a minimum cost.

(c) The best grades of rice are always sun-dried or steeped and generally hand husked, and selected from the finer long grain of the *chotan aman* crop. They may be preserved for a long time, 10 to 15 years, e.g., *baspathi* rice in the following way, from the attack of insects, weevils and moths, by protecting it in gunny bags and by the addition of *neem* leaves. From bacterial action the rice is pro-

tected by keeping it dry by the addition of lime, arrowroot or rice flour, and turmeric which is considered to be an antiseptic.

(iii) *Storage.*—In Calcutta the dangerous time for rice to be infected is between the months from July to the end of September. Infection may occur immediately after milling, when the rice is stacked in large pyramids on the ground before being put into bags. The lower layer starts sweating; when bacterial change takes place the temperature rises and the rice gets damaged. Under these conditions the rice merchants repolish the diseased rice and mix it up with healthy rice. If the rice is stored in gunny bags and kept in cool ventilated godowns no infections will occur, but otherwise the lower bags will commence to sweat and disease occur. A similar condition occurs in ships when the rice is stored near the engine room and over the bilge.

(iv) *In rices causing epidemic dropsy* the bases are largely soluble. A careful washing of this rice is required, especially in large messes and communities like jails, etc. The neurotoxin in beriberi rice is not water-soluble.

(v) *The necessity for vitamins in rice and in the diet.*—As long as the public demand a highly polished rice and do not object to parboiling, so long will the millers supply this rice. Steeping the rice and lessening the polishing processes would do much towards the prevention of the disease in the grain. The absolute necessity for the different food-accessories (vitamins) is apparent from all the work that has been done on the subject.

Curative treatment.—The first essential is to remove the source of the poisons; it is therefore not necessary to stop the eating of rice, but to see that the rice supplied is not in any way diseased. The next essential step is to increase the general vitamin content of the diet, as many of these people are poor and have been subsisting largely on a rice diet with very few additions; a short time in hospital with rest and liberal live diet makes all the difference to these poor people. Our other experiments on susceptibility have shown the importance of adrenalin in blocking the action of many of these bases. It is the most valuable therapeutic agent which we have in this condition, as it stops the action of these bases, and diminishes susceptibility. It is not a miraculous remedy restoring nerves that have been damaged or heart muscle that has been badly injured: the subsequent cure of both these lesions depends on the extent of irremedial damage. Graph XI illustrates the value of adrenalin in such a case where caffeine was first given, then digitalis, finally 2 minims of adrenalin intramuscularly twice daily: the urinary output suddenly rose, the cedema lessened and by the third day had disappeared. After a few days of

the adrenalin injections, suprarenalin gr. 1 and thyroid extract gr. $\frac{1}{4}$ was given between meals, twice a day for three weeks, in the hope of diminishing the susceptibility towards these bases.

We finally have to thank Capt. P. De, M.B., Assistant Professor of Pharmacology for his invaluable help during the course of these experiments which involved three years' continuous work.

CONCLUSIONS.

(i) Epidemic dropsy and beriberi are different clinical aspects of a toxic syndrome caused by the ingestion of poisonous bases formed in rice under certain conditions; although similar poisons can be formed in other foods under storage; e.g., tinned provisions, dried fish, etc.

(ii) This disease in the rice can readily be detected by the water test, and moreover these two

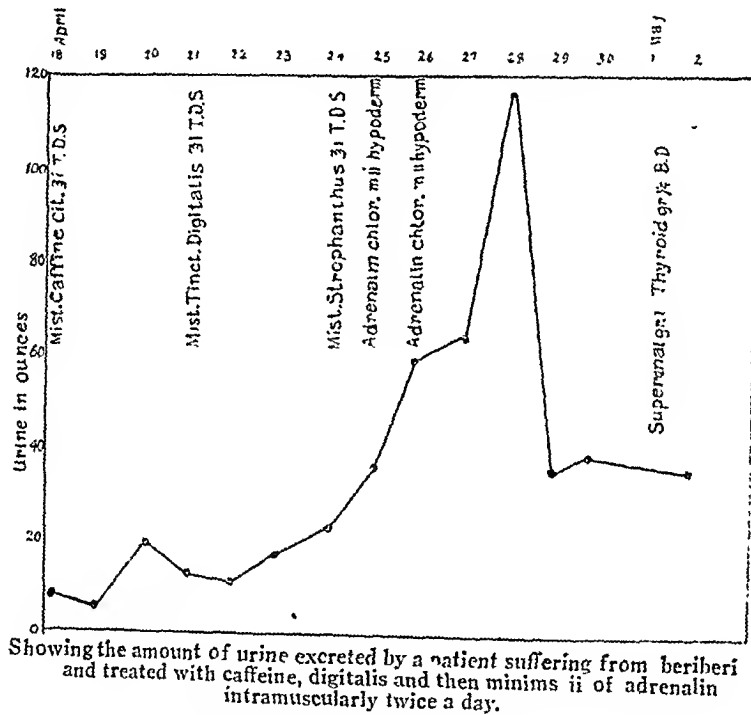
(viii) The bacteria and their spores, as well as their effects on the structure of the fruit, can be demonstrated by microscopical sections and cultural tests.

(ix) Experimentally by spraying rice or inoculating sterile rice media under certain conditions of temperature and humidity, the same poisonous bases are formed from the proteids.

(x) These bases pharmacologically produce all the signs of the disease; viz., œdema, heart effects, and para-sympathetic paralysis, and they are not present in the non-inoculated control rice media.

(xi) In sterile rice medium that has been inoculated by this bacillus under aerobic conditions at blood heat, the medium is liquefied and the water-soluble bases produced. The neurotoxin is only produced when the temperature is raised

GRAPH XI.



clinical entities are associated with two different grades of rice.

(iii) A spore-forming proteolytic bacillus of the *B. vulgaris* group is commonly found in such diseased grains.

(iv) These bacteria attack the fruit, particularly during the hot humid months of the monsoon, especially if the grain is stacked in non-ventilated rooms.

(v) Highly polished grain is more easily attacked owing to the loss of the aleurone layer and embryo, and the consequent exposure of the delicate cells of the fruit.

(vi) Parboiling kills the enzymes in the grain, and so further helps bacillary invasion.

(vii) Bacterial invasion of the rice occurs more commonly from the germ site, but in highly polished rice, it also occurs as commonly from the surface.

to 50°C. and the conditions made anaerobic by a layer of vaseline.

(xii) The difference in the relative proportions of the signs in epidemic dropsy and beriberi is due to these bacteria acting on two different grades of rice, and producing different amounts of the toxins causing neuritis and œdema.

(xiii) The poisons in the rice causing epidemic dropsy are water-soluble and are therefore found in the rice water, thus explaining the incidence amongst Hindoo widows, and in large communities; in the former the rice is cooked till dry, in the latter it is improperly washed.

(xiv) The neurotoxin found in rice causing beriberi is soluble in alcohol only, so that the disease is seen in persons cooking for themselves.

(xv) Individual susceptibility plays an important part when the amount of poison ingested

is small in amount, e.g., the small incidence sometimes seen in a jail population. When the quantity ingested is very large, e.g., in a whole family attacked by epidemic dropsy, it then determines the mortality.

(xvi) Hypo-adrenia in particular, and hypothyroidism to a lesser extent, increase the susceptibility towards these bases, and this in turn is closely correlated with colouration of animals.

(xvii) Rice polishings contain bases that are antagonistic to the bases found in diseased rice.

(xviii) The pericarp acts mechanically by preventing surface bacterial invasion of the grain, and is further aided by the protective layer of bacteria living under the pericarp of all fruit (Fowler).

(xix) Polished parboiled rice is the most dangerous of all rices and can be protected only by preservatives and proper storage.

(xx) Adrenalin in small doses, minimises intramuscularly twice a day, diminishes cell permeability and so relieves the oedema, and also antagonises the action of the water-soluble bases. To a lesser extent it protects the para-sympathetic.

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STONE IN THE BLADDER.

By HENRY SMITH, C.I.E.,

LIEUT.-COLONEL, I.M.S., (retd.).

WITH reference to his article on this subject in the *Indian Medical Gazette* for April 1924, I should like to compliment Lieut.-Colonel A. J.

Vernon Betts, I.M.S., on his fine results,—results which are quite intelligible to an old hand in the game. His article suggests to me a few points of general interest.

Sounding for Stone.—You can detect a large stone with any instrument you pass. It is the small ones of a few grains weight which are of interest. I have frequently failed to sound them in a patient, anæsthetised and with the bladder distended, with a sound. The moment I passed a small lithotrite, however, and opened its jaws, the pebble dropped into its grasp. The late Colonel Kccgan, I.M.S., made the same observation, but did not publish it. I would suggest that, when examining a child, when the result is negative to a sound, the operator should not be satisfied of the absence of stone until he has searched with a small lithotrite. I am confident that those who rely on the sound often send the child away until the stone grows bigger.

The same applies to sounding for fragments.

Irrigator versus Evacuator for the same purpose. I have frequently used an irrigator when my evacuator was out of order. It is satisfactory, but not as good as the evacuator. It can safely be used with four feet of pressure; I never used it with less.

Median lithotomy.—I would suggest that those proposing to adopt this incision should consider how little space there is between the rectum and the urethra. The space is so small that the rectum is opened more often than the published facts would indicate. I have thus opened it myself. Why median incision, when there is any amount of room laterally for either a Keith's operation or a lithotomy?

Suprapubic Cystotomy for Large Stones.—When the statistics extending over, say, ten years of the leading stone hospitals in India are classified, the results are very poor. I once did this, by sending a man round who got from the hospital registers details as to age, weight of stone, etc. It was found that perineal lithotomy gave a mortality of 10 per cent., whereas the suprapubic operation gave one of over 40 per cent. The litholapaxies done in all these hospitals gave a mortality of only about 2 per cent.; the two cutting operations being largely reserved for stones which could not be crushed. It was interesting to note that the suprapubic operation was done for just as small stones as was the perineal one.

In the perineal operation, the mortality was in direct proportion to the size of the stone. If the stone was small, the mortality was low; if large, it was high. To improve matters, I got Weiss to make a lithotrite about No. 24, to be used through a lateral lithotomy wound. This can be used to cause one or two fractures in a big stone, after which an ordinary No. 17 or 18 can be used to reduce it to fragments of such size as a medium sized forceps or scoop will extract. This in my experience is infinitely safer than

suprapubic lithotomy, and much safer than dragging out a large stone through a perineal wound.

The Art of Using a Lithotrite.—Language is a poor medium for teaching an art. I would suggest that beginners should get a fresh goat's bladder; distend it with air, and mould a plaster cast to fit it one-third up, and fix it to the mould with some first class glue. It could then be deflated, a nugget of medium hard brick put into it, a lithotrite passed, and the bladder again distended with water, the water being secured by tying a rubber tube around the neck tight enough to retain the water, but not so tight as to obstruct the movements of the lithotrite. A child's toy balloon would do as well, but is more or less transparent, so that one can see what one is doing, in place of relying on touch. By a little amusement of this kind, I think that one could acquire considerable dexterity.

Why is the suprapubic operation so fatal in India? Simply because we have not got sufficiently good nursing. It is due to extravasation of urine into the very loose cellular tissue around the bladder. For a day or two the patient appears to be all right. Then diarrhoea—septic diarrhoea—sets in, and the end is at hand. In India I am so opposed to leaving a suprapubic wound open that in prostatic enucleation or suprapubic cystotomy I consider that much better results would be obtained if the bladder wound were carefully stitched up, and a stab wound made in the breech and a small tube passed into the bladder to drain it through the breech for a few days until the bladder wound had healed,—than by leaving the bladder to drain through a suprapubic wound.

SERUM REACTIONS IN SYPHILIS.

By R. B. LLOYD, M.A., M.B., B.C.,

MAJOR, I.M.S.,

Imperial Serologist.

IN view of the increasing attention which is now being paid to the development of precipitation methods for the serum diagnosis of syphilis, the present time is opportune for a consideration of the relative value of the more important of these tests and a comparison with those which depend upon complement fixation, i.e., the Wassermann test.

It is a very remarkable fact that the test introduced eighteen years ago by Wassermann and his co-workers has held the field practically unchallenged until the last few years. This is in itself a great tribute. Modifications of the original technique have been numerous, the most important of which was the substitution long ago of extracts of normal organs for the extracts of syphilitic organs originally used as antigens; and in recent years many different techniques involving greater or less departures from the original test have been employed, as

standardisation of the technique has so far proved impracticable. The reaction broke entirely new ground, and the only criterion which could be applied to it was the degree of conformity with the clinical findings in an enormous number of cases all over the civilised world. This, of course, is the correct criterion, and it has further been amplified by careful post-mortem findings. That it has withstood this test is common knowledge; based on millions of cases it is known to be one of the most trustworthy of all clinical pathological diagnostic measures. It, however, depends upon the recognition of an unknown substance or substances in the serum—termed "reagin" by Neisser—and complicated reagents are required for its performance. The reagin is apparently produced by the tissues under the influence of the spirochaetes, and there are strong reasons for believing that it is not a defensive antibody; but that as Kolmer¹ states: "The complement fixation reaction is to be regarded as an index of the degree of infection rather than of immunity." Hence its use in the control of treatment. The Wassermann test was subjected to extremely stringent examination by a special committee of the Medical Research Council² in London, who in 1918 expressed the opinion "that there is no process of bio-chemical diagnosis that gives more trustworthy information or is liable to a smaller margin of error than the Wassermann test when it is performed with completeness and with proper skill and care." They further recommended that Wassermann tests should be concentrated in central laboratories, as a large turnover of work leads to increased efficiency.

The essential of the test is interaction between the syphilitic serum and the antigen, which latter is a colloidal suspension of lipoidal particles usually prepared from a normal heart. There is evidence that this interaction is the formation of a precipitate. Complement if added to the tube is fixed by this complex and is rendered incapable of effecting hæmolysis when sensitised cells are subsequently added, whereas if the patient be not suffering from syphilis hæmolysis occurs. The sensitised cells are, therefore, merely the indicator to show whether fixation of the complement has occurred or not.

If then the formation of a precipitate is the essential part it ought to be possible by changing the conditions of the experiment to render that precipitate visible, thus simplifying the technique and obviating the necessity for complement and the indicator reagent (sensitised cells). On these lines many attempts have been made to develop satisfactory precipitation tests, but in order to avoid too great complexity discussion will be limited to a few of the more important tests, the Meinicke³ reaction, the Sachs Georgi⁴ reaction, the

Sigma⁵ reaction of Dreyer and Ward and Kahn's⁶ reaction.

The obvious desiderata for a satisfactory test are:—

1. No unspecific reactions (false positives).
2. High degree of sensitiveness (avoidance of false negatives).
3. Simplicity of performance.
4. The results should, if possible, be capable of quantitative expression.

The earliest of these tests to be at all widely used was the Meinicke reaction (1917). There have been several modifications of this, and as his work cannot conveniently be condensed the reader is referred to the literature. Meinicke's latest method he terms the "Trübungsreaktion." After the Meinicke test came the Sachs Georgi reaction (1918). This in brief consists in adding diluted inactivated serum to the antigen suspension in salt solution and incubating. The mixture before incubation is opaque, and in a fully positive serum the opacity disappears and is replaced by a water clear solution in which is an abundant white flocculent precipitate. A considerable objection to the test is the long incubation necessary which involves the risk of bacterial contamination which may simulate a positive reaction. Opinions differ somewhat as to the value of the Sachs Georgi test. These different views are no doubt partly dependent upon slight differences of technique and also upon the varying sensitiveness of the different Wassermann systems with which comparison has been made; for as stated above the technique of the Wassermann test has not as yet been standardised.

Many workers find that, while agreeing in a high proportion of cases with the Wassermann results, the Sachs Georgi test is slightly less sensitive, particularly in cases under treatment. Further in the hands of some it has been found to yield a by no means negligible number of false positives as judged clinically; and while it has a certain usefulness if carried out along with other tests, reliance on this test *alone* is not advisable.

In connexion with sensitiveness it is not to be supposed, of course, that the extinction point of the serum reaction represents the end of the disease, for the evidence points in the opposite direction. *A fortiori*, so long as reagin is still present we must regard the disease as uncured. Further we must in treatment endeavour not only to reach the extinction point but to pass beyond it. As Harrison¹⁸ aptly puts it "Although the Wassermann test looks deeper into the patient's condition than the naked eye, it is not an absolute guide to a decision regarding the absence of syphilis." Conformably to this we should use that reaction which is the last to disappear, provided we are satisfied that no

false positives are yielded by the technique employed. The Sachs Georgi reaction being in the opinion of many somewhat deficient in sensitiveness in treated cases may fail here. It must be added that many of the leading workers do not agree that the Sachs Georgi test is deficient in sensitiveness. The sensitiveness is evidently rather variable. A large number of comparative observations by the Wassermann and Sachs Georgi reactions have been carried out in my laboratory and the results will be published shortly. I may say here, however, that while our results indicate that there is a general correspondence with the Wassermann results in a large proportion of cases, the test shews in our hands evidence of deficient sensitiveness.

In 1921 Dreyer and Ward introduced their well known Sigma reaction. This very brilliant piece of work is a precipitation test similar in principle to the Sachs Georgi test, though the technical details are different. This method was examined by a special committee of the Medical Research Council in 1923, who reported extremely favourably on it. Their results indicated that it is as sensitive as the Wassermann test in untreated cases; it seemed to be more sensitive in treated cases, and further the results are capable of quantitative expression. Dreyer lays special stress on this latter point. The measurement of the amount of "Wassermann substance" (reagin) present is no doubt important if it can be done accurately and without undue complexity. Vernes¹⁴ in Paris attempted the measurement of the amount of infection using for the purpose a special test. His method is complicated, but is in principle a modified Wassermann test, and it would appear to be doubtful if he achieved anything more than can be ascertained from the Wassermann reaction. The objection has been advanced against the Wassermann test that with fixed serum doses there must be some cases with more reagin present than suffices for a fully positive result, and that this excess will not be detected. Let us suppose there be twice the necessary amount present. We may call this 200 per cent., yet the result is the same as if 100 per cent. were present. It is contended that this is a source of weakness in treatment, for if the disease were so far improved that half the reagin had disappeared, there would still be enough left to yield a fully positive result. This might appear to suggest that the treatment had been ineffective when in reality the fact is otherwise. This criticism is undoubtedly justified. To what extent it is important practically the future will show. In the earlier stages of syphilis it is, of course, very much the exception for a positive Wassermann reaction to be uninfluenced by treatment, so that evidently the submaximal point is soon reached; and after that the diminution of the reaction shows fairly well how the case is going. The case is different with old lesions. The obstinacy of

the positive Wassermann reaction in this class of case is, of course, well known, and it may be of advantage to determine the Sigma values. In this connection it would be interesting to examine the Sigma values of the so-called "Wassermann-fast" cases to see whether treatment reduces the reagin "titre" or not. The reports of the British workers under the Medical Research Council¹⁵ were unquestionably very favourable to the Dreyer Ward test; this favourable opinion was not, however, borne out by the continental workers in connexion with the International Conference referred to below. Some of the workers appear to have found difficulty in obtaining results anything like as good as the earlier reports. Further, some authorities have expressed doubt as to whether the degree of flocculation present can be observed with sufficient precision to justify quantitative expression of the result. In the Dreyer Ward reaction the quantitative result is obtained by multiplying the factor representing the sensitiveness of the suspension used (suspension factor) by the dilution in which standard flocculation occurs, e.g., if a serum in a total dilution 1/50 causes standard flocculation, then 50×1.6 (suspension factor) = 80 units. They describe this result as 80 Sigma units. The test is somewhat laborious and meticulous attention has to be paid to the technical details, as it has been shown in a recent paper by Mörch¹⁶ (Professor Madsen's laboratory) that slight variations in some of the preliminary steps largely influence the final result. Dreyer himself also insisted on this. Harrison,¹⁷ whose experience is probably unrivalled, states "as to the reliability of the Sigma test there can be no doubt." Some explanation may, perhaps, be forthcoming of the weak results referred to above, and while a final judgment may be deferred for the present, it seems that this test has very considerable possibilities.

A conference of experts on serological standards in connection with the League of Nations Health Organisation¹⁸ assembled in Paris in November 1922, and presented among other questions reports on the sero-diagnosis of syphilis which may be summarised here. The conference did not report on the Kahn test, to be described later.

Professor Madsen (Copenhagen) reported that the Meinicke test is specific but insufficiently sensitive. The Sachs Georgi test is useful but gives a certain number of false positives as judged clinically, and has the drawback of not being quantitative. The Wassermann reaction is quite specific and gives a high percentage of positive results, its drawback being its complexity. The Sigma reaction is the most sensitive of all. It allows a quantitative titration but shows a certain number of false positives. He concludes that the Wassermann and Sigma

reactions are the best, but that both require to be carried out in adequately equipped laboratories by experienced workers. Wyler (London), working under the supervision of Harrison, finds a larger percentage of positive reactions with the flocculation tests with some slight tendency to non-specific reactions; and the latter in his latest book³⁴ quotes the researches carried out by Wyler for the Medical Research Council which appear to indicate that in his hands the flocculation tests are rather more delicate than the Wassermann test and show few false positives. Experiments carried out at Warsaw by Milinska and Modrzejewska under the direction of L. Hirszfeld showed that both the Sachs Georgi and Meinicke reactions are specific. He finds a remarkable concordance between the Wassermann and Sachs Georgi tests. In spite of their specificity he does not believe that either of these two flocculation methods can in their present state replace the Wassermann reaction. It is easier to make the flocculation test but there are difficulties in reading the results, particularly in slightly positive cases, and for this reason he considers the Wassermann test superior to the flocculation tests. Of the precipitation tests he prefers the Sachs Georgi. He expressed doubt as to the advantage of the quantitative results obtained by Dreyer's method owing to technical difficulties, and on the whole he is of opinion that these methods, on account of the difficulties in reading the results, cannot replace the Wassermann reaction. Moreover, he is not in favour of the calculation of the degree of positive reaction by units. On the other hand he thinks precipitation methods useful for comparing the sensitiveness of the Wassermann reaction in different laboratories.

Professor Kolle (Frankfort) states that considerable similarity exists between the results of the flocculation and the Wassermann tests. He considers that both the Meinicke and Sachs Georgi reactions should be performed side by side with the Wassermann test. He advocates the use of both the flocculation tests for the reason that in the Sachs Georgi reaction the antigen is cholesterinised, whereas in the Meinicke it is not. Muller (Vienna) concludes that the Wassermann reaction gives more often a positive result than the flocculation test: the greatest difference being found in latent syphilis, especially in cases under treatment, in tabes, sclerosis, and aortitis. Of the precipitation tests the most positive results were given by the Sigma reaction, with the Meinicke second and the Sachs Georgi third. Their investigations have shown that the best method known up to the present is the Wassermann reaction which gives when properly performed more valuable answers than the flocculation tests. With an equal specificity the Wassermann reaction will more often be positive, especially in cases of latent syphilis, and still more in cases of syphilis under treatment. He

further considers that the results of the Wassermann reaction could be brought to a higher degree of efficiency if researches were undertaken to arrive at an antigen of optimal efficiency. This point, which has been very carefully gone into in connexion with the flocculation tests, has not been sufficiently considered in the Wassermann reaction. In contrast to the results of Harrison and Wyler he finds all the flocculation tests inferior in delicacy to the Wassermann test in addition to the difficulty of reading the former. Of the flocculation tests in his hands the Dreyer has proved the best. It is as specific as the Wassermann reaction and it should be possible to simplify the technique. He will not dogmatise as to whether any one of the precipitation tests could be so far perfected as to reveal surely all those cases of syphilis that now the Wassermann reaction alone can detect, but he is tempted to say that the technique of the complement binding reaction constitutes the more delicate reagent, so that it can often reveal relations between serum and antigen that will never be accessible with any certainty to flocculation tests. At present we must certainly use the Wassermann test as well as the flocculation test.

Renaux (Brussels) is of opinion that the weak point of flocculation reactions consists in the difficulty of reading results. In the Sigma reaction, even if carried out with a standard flocculation, there is often doubt as to the degree of flocculation observed, and this affects the number of Sigma units attributed to a given serum. He considers that both the Meinicke and Sachs Georgi antigens have at times an unfortunate tendency to auto-flocculation, and in his opinion the observation of the Wassermann test is still the most accurate. The Sigma reaction is more difficult to read and requires more experience than the Meinicke and Sachs Georgi tests. Professor Sachs (Heidelberg) is of opinion that the Dreyer Ward reaction is giving increasingly good results from the point of view of delicacy, but there is some tendency to non-specific reactions. On the whole he is of opinion that flocculation tests show far-reaching parallelism both with the Wassermann test and with each other. It has not so far been possible to obtain complete concordance by the comparative testing of any two methods. There are some syphilitic sera which give a stronger result with the Wassermann test or with flocculation tests or only with one and not with another of the various flocculation tests. The divergences chiefly occur in cases of latent syphilis and syphilis under treatment. The various methods are, therefore, complementary to one another, and in that sense flocculation tests may at any rate be regarded as valuable auxiliaries to the Wassermann.

In view of the marked divergences brought out by the reports received, the conference decided

to compare the sensitiveness of the Wassermann tests in different institutions. They accordingly sent portions of the *same* sera to several laboratories of the first repute. Flocculation tests also were done on these sera. Considerable differences in results were obtained, the chief difference being in the quantitative titration of the Sigma test. In order to determine the cause of these divergences the Health Committee of the League of Nations decided to convene a conference at which the investigators were to make *simultaneous tests of the same sera* by the different methods. This conference was held at Copenhagen¹⁹ in November and December, 1923. 536 sera were thus simultaneously tested by nine workers, all of whom were experts. Full controls were included and elaborate precautions taken to ensure strictly comparable results. This is perhaps the most exact experiment of its kind yet performed.

After a long and thorough discussion on the results obtained, the following conclusions were unanimously approved by the conference. "The Wassermann test yielded in this conference the uniformly greatest number of positive reactions in known cases of syphilis. With regard to specificity, no unspecific results whatever were obtained by certain of the investigators, and on the whole results which were possibly unspecific occurred very rarely. The results obtained by those workers who employed several antigens were not better than those using one only. It is concluded that the preparation of the antigens and the determination of the precise dose of complement to be used are of at least as great importance as the use of multiple antigens. The best results were obtained with heart extracts. The work of the conference has shown that the flocculation tests cannot at present replace the Wassermann test. It must, however, be emphasised that, in the course of the present conference, they have yielded positive results in a certain number of cases of syphilis in which the Wassermann reaction was negative, although the latter test showed itself on the whole to be more sensitive.

It is, therefore, recommended that the Wassermann test and the flocculation tests be carried out side by side, since by such a combination the best results have been obtained. Comparing the various flocculation tests they found that the Meinicke reaction was specific but the results were on the weak side. As to the other flocculation tests the original reaction of Sachs Georgi has yielded, during this conference, more positive results in known cases of syphilis than the Sigma method, but conformably with this greater sensitiveness its specificity was found to be slightly impaired. Since, however, these findings do not agree with those which have been obtained in certain other laboratories, it is advisable to make further investigation in order to discover which of these two recommendable methods gives the better results.

The several methods for the serological diagnosis of syphilis should only be carried out in laboratories specially adapted to the purpose and by experienced workers."

It will be gathered from the above resumé of the result of the last International Conference that the Wassermann test is preferred to any precipitation test.

Kahn in America in 1922 published a test which seems likely to be generally used. His test is in principle similar to the Sachs Georgi test, but with a view of obviating the disadvantage of a long incubation, he varies the preparation of the reagents so as to use them in as concentrated a form as possible. To this end he uses undiluted serum and a specially prepared antigen. His method undoubtedly produces a highly potent antigen. Kahn's aim was to devise a test the results of which could be read quickly. He uses the antigen and serum in such quantities as produce the maximum precipitation. The result is so sensitive that it produces spontaneous precipitation in strongly Wassermann positive sera. There can be no doubt that Kahn's reaction is valuable and may go far, and it is now being exhaustively tested in many different laboratories. Considerable care is required in the mixing of the antigen to prevent non-specific precipitation. For satisfactory results the serum must be absolutely clear. Sera which contain fat or which are even slightly hæmolyzed yield unsatisfactory results.

The Kahn reaction is being very widely used in America, and is now attracting a good deal of attention in England, and its literature has already become extensive. A few of the reports may be referred to. Detweiler²⁰ in a comparative series of 1540 cases tested by the Wassermann and Kahn reactions found agreement in 94.2 per cent. Of the 90 discrepancies, 51 were Wassermann positive and Kahn negative. Out of these 51, 40 were proved cases of syphilis, most of them under treatment. The unproved cases were regarded as probably syphilitic because of the finding of persistent complement fixation in each case. The remaining 39 discrepancies were Kahn positive and Wassermann negative. Of these slightly less than half were proved cases of syphilis. The percentage of agreement in this series agrees closely with the figures given by Dreyer and Ward, Sachs Georgi and others. He makes the important point that the actual percentage of agreement is of little value unless the proportion of syphilitic cases in the series and specially the proportion of positive treated cases is stated, as very few discrepancies will occur in non-syphilitic sera; and if the series be chiefly made up of these the percentage of agreement is bound to be very high and may give rise to a false impression of the value of the test under examination. For

example Moody²¹ reports 98 per cent. agreement between the Wassermann and Kahn reactions in 1500 cases, but only 15 per cent. of these cases were syphilitic so that it does not give a true estimate. Detweiler concludes that while the Kahn reaction affords results remarkably parallel to the Wassermann test, it is not yet the equal of the latter in reliability. It fails principally in three classes of cases;—(a) treated syphilis, (b) early primary syphilis, and (c) cerebrospinal syphilis. Anderson and Fischer²² performed a parallel series of Wassermann and Kahn tests on 177 cerebrospinal fluids. They found agreement between the two tests in 68 per cent. only, and where they differed it was the Kahn that was weaker. They conclude that the Kahn test is useful but must be more worked out. Miss Rockstraw and Bent²³—to the former of whom I am greatly indebted for first showing me the Kahn reaction in America last year—have recently published a comparison of the Wassermann, Sachs Georgi, and Kahn tests in 1022 sera and spinal fluids. They found the Kahn test was more sensitive than the Sachs Georgi but slightly less sensitive than the Wassermann test with cholesterinised antigen. In the case of untreated syphilis there was close agreement (98.9 per cent.) between the Kahn and Wassermann reactions; but in the case of treated syphilis the agreement was less marked (86.5 per cent.). Comparison of the Sachs Georgi test with the Wassermann reaction showed that the former was often negative when the Wassermann reaction was strongly positive; and in cases in which a positive Sachs Georgi was obtained with a negative Wassermann there was generally no evidence clinically of syphilis. In the case of spinal fluids the Kahn test proved to be of little value.

The Kahn reaction is now being examined in this department. It is too early yet to give a definite opinion, but the results so far obtained are extremely promising.

While the above account is largely occupied with the advances made in the direction of precipitation tests, it must not be supposed that the Wassermann reaction has stood still. The chief advance recently has been Kolmer's²⁴ new technique which is believed to be very sensitive and valuable. Kolmer²⁵ has recently made the following estimate of the practical value of the precipitation reactions, "Summing up the subject it may be stated that the precipitation reactions are not as sensitive as the complement fixation reactions conducted with a technically correct and acceptable technique; that they are more subject to misinterpretation and should not be relied on alone for the serum diagnosis of syphilis. They may, however, be useful as controls in the complement fixation test, and for this purpose the Meinicke (third modification) and more especially the

Sachs Georgi and Kahn reactions are to be recommended."

SUMMARY.

It will be gathered from the foregoing that no finality has as yet been reached, and much fuller information will shortly be available. Meanwhile the present position may be summed up as follows:—

(1) While there are material differences amongst some of the leading workers regarding the value of the flocculation tests, there is a general consensus of opinion that the Wassermann reaction remains for the present the best test for the detection of syphilis, though one or more of the flocculation tests may be done in addition.

(2) The great advantage of the Wassermann test is its high degree of sensitiveness, combined with an almost total absence of false positives.

(3) While the earlier flocculation tests have not proved as satisfactory as was expected, the more recent developments are much more promising. Improvements in technique may very possibly enhance the value of the Sachs Georgi test. The Kahn test is simple and apparently very serviceable. The former of these tests is however not quantitative. The Dreyer Ward test is valuable and quantitative and the technique should admit of simplification.

(4) It is probable that some form of flocculation test will eventually attain to extended use; although the difficulty in reading intermediate grades of positive reaction is at present considerable.

(5) The occurrence of non-specific reactions in flocculation tests needs further examination.

(6) Before any particular flocculation reaction can be accepted as the standard test, it must be clearly shown to be capable of yielding satisfactory results with cerebrospinal fluid; since this is the direction in which syphilis therapy is concentrating.

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A PRELIMINARY NOTE ON THE SUCCESSFUL TREATMENT OF KALA-AZAR WITH "STIBAMINE GLUCOSIDE."

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SEVERAL aromatic compounds of antimony have been used in the treatment of kala-azar and other diseases in which antimony is of value, and it does not seem altogether improbable that in the near future these compounds will altogether replace the antimony tartrates in the treatment of such diseases.

"Stibenyl" (acetyl-para-amino-phenyl stibiate of sodium) was the first of these compounds to be used with success, but our

experience in India with this compound in the treatment of kala-azar was very discouraging, (Napier 1923). Good results in the treatment of both "resistant" and previously untreated cases of kala-azar with "urea-stibamine" have also been reported (Shortt and Sen, 1923). About a year ago I published a preliminary note on the successful treatment of kala-azar with meta-chlor-para-acetyl-amino-phenyl stibiate of sodium (Von Heyden 471) and during the last few months, since we have been able to get a large supply of the compound, we have adopted this as the standard treatment for kala-azar in the wards of the Carmichael Hospital for Tropical Diseases in Calcutta.

A large number of aromatic compounds of antimony has been prepared up to the present, and it is probable that a much greater number will be prepared, so that therapy with these compounds can be said to be in its infancy, and it is more than probable that the best compound for the treatment of kala-azar has not yet been found.

Some of the essential qualities, namely, constancy of composition, stability and low relative toxicity, can be tested in the laboratory; but unfortunately there is no satisfactory method of testing the therapeutic properties of these compounds except by trial on patients. It is, therefore, essential that one should test continually the therapeutic qualities of new compounds which laboratory experience has indicated, whilst at the same time carrying out a thorough trial of the compounds which preliminary trial has suggested as the most promising. Thus, whilst using von Heyden 471 as the routine treatment in the wards, I have at the same time been testing the value of certain other compounds, mostly aromatic compounds, amongst them "stibamine glucoside."

STIBAMINE GLUCOSIDE.

Dr. Henry, of the Wellcome Chemical Research Laboratory, very kindly gave me a sample of this compound when I was in England last summer and has subsequently sent me a second sample. It is an aromatic compound allied to sodium para-amino-phenyl-stibiate with an antimony content of about 30 per cent. and a minimum lethal dose of about 500 mgm. per kilo.* The sample that I brought out with me, in sealed ampoules, was subjected to hot climatic conditions for two to three months, but there was little evidence that any change had taken place, although from our toxicity experiments here it seemed possible that there had been a slight

increase in the toxicity of the compound. This increase was not, however, a serious one, and still left the toxicity of stibamine glucoside as less than half that of any other antimony compound that we had tested.

TREATMENT OF THE CASES.

Altogether 10 cases were treated with stibamine glucoside. In August, 5 consecutively admitted cases were placed under treatment with this compound, and again immediately I received the second sample 5 more consecutively admitted cases were put under treatment, so that no selection of cases whatsoever was made. All the cases were proved to be suffering from kala-azar by the finding of the parasite either in the peripheral blood or in the spleen pulp, after spleen puncture. Eight of the cases had received no previous antimony treatment, and neither of the previously treated cases had had antimony injections within three months of applying to us for treatment. The compound, which is an easily soluble powder, was dissolved in distilled water to make a 4 per cent. solution and was injected intravenously in doses of 0.05 gramme to 0.3 gramme. An initial dose of 0.2 gramme caused vomiting in the cases in which it was given and abdominal discomfort was felt, if not actual vomiting, in the patients to whom I gave 0.3 gramme, so that as a routine measure in the last few cases I gave 0.1 gramme as the initial and 0.2 gramme as the maximum doses for patients weighing over 50 lbs., and it seems probable that this will be a good system of dosage to adopt. As in the case of most antimony compounds, children appear to tolerate relatively larger doses. The injections as a rule were given on alternate days.

The cure was confirmed by direct and cultural examination of the spleen puncture material in cases where the spleen was palpable, and of the liver puncture material where it was not, taken about one week after the last injection had been given.

The results of the treatment are given in tabular form and it will only be necessary to add a few additional details, that cannot well be tabulated, about each case.

Case No. 1—This case had been running a continuous remittent fever for some time before treatment was commenced, but the temperature was certainly showing a downward tendency, although it was over 100°F. on the day previous to the first injection. This patient was not emaciated, so showed little increase in weight after treatment.

Case No. 2—This was a weak, anæmic boy who had been running an irregular fever for some time. His temperature fell below normal after the first injection and only rose above normal towards the conclusion of his treatment when he had a typical attack of dengue.

Case No. 3—This was a boy who had had a course of 50 injections of sodium antimony tartrate, given by a private doctor, and had relapsed after a short period of freedom from fever. When he was admitted he was suffering from a high remittent type of fever; his

* Compared with 25 mgm. per kilo. for sodium antimony tartrate, 133 mgm. per kilo. for "Stibenyl" (Fargher & Gray, 1921), and about 160 mgm. per kilo. for "von Heyden 471"; the toxicity of "urea-stibamine" being about the same as that of "Stibenyl," (Brahmachari, 1922).

temperature did not rise above the 99.5° line after the first injection, but did not remain below normal until after the 8th injection.

Case No. 4.—This was a very bad case in which it was thought advisable to lengthen the intervals between the injections; he made a very good recovery, however, and after losing a few pounds of weight at the beginning of treatment registered a net gain of 11 lbs., but

at first but 48 hours after the fifth injection she collapsed quite suddenly and died within a few hours.

CONSIDERATION OF THE RESULTS.

As this is essentially a preliminary report a detailed comparison of the results here obtained with those obtained by the use of

| Case number. | Race or Religion. | Sex. | Age. | Duration of illness prior to treatment in months. | Weight of patient on admission, in lbs. | Number of injections given. | Total amount of compound given, in grms. | Total relative amount in grammes per 100 lbs. weight of patient. | Duration of actual treatment in days. | Gain or loss of weight during stay in hospital. | Number of injections given prior to cessation of fever. | Duration of fever from commencement of treatment, in days. | Size of spleen below costal margin in inches. | | Leucocyte count at end of treatment; number of corpuscles per cmm. | Evidence of cure. |
|--------------|-------------------|------|------|---|---|-----------------------------|--|--|---------------------------------------|---|---|--|---|------------------|--|--------------------------|
| | | | | | | | | | | | | | Before treatment. | After treatment. | | |
| 1 | Hindu | M | 18 | 10 | 100½ | 12 | 2.725 | 2.71 | 27 | + 3 | 1 | 2 | 2 | 0 | 7,500 | Liver puncture culture. |
| 2 | " | M | 18 | 9 | 77½ | 12 | 3.1 | 4.0 | 27 | +13½ | 1 | 1 | 2½ | 0 | 10,500 | Liver puncture culture. |
| 3 | " | M | 12 | 10 | 43½ | 12 | 2.75 | 6.53 | 26 | +12½ | 8 | 18 | 7 | 2 | 9,375 | Spleen puncture culture. |
| 4 | " | M | 16 | 5 | 72 | 10 | 2.2 | 3.06 | 26 | +11 | 4 | 12 | 4 | P* | 7,200 | Clinical. |
| 5 | " | M | 14 | 6 | 55½ | 15 | 2.65 | 4.8 | 60 | + 5½ | (15) | (60) | 3½ | 0 | 6,900 | Liver puncture culture. |
| 6 | " | M | 16 | 1 | 82 | 15 | 2.54 | 3.1 | 33 | + 7 | 3 | 6½ | 4 | 0 | 5,900 | Liver puncture culture. |
| 7 | " | M | 11 | 6 | 49½ | 15 | 2.6 | 5.2 | 33 | +13½ | 5 | 11 | 6 | 2 | 8,000 | Spleen puncture culture. |
| 8 | Indian Christian | M | 7 | 6 | 36½ | 15 | 2.14 | 5.9 | 33 | +11½ | 6 | 13 | 6 | 2 | 7,500 | Liver puncture culture. |
| 9 | European | F | 18 | 5 | 96½ | 15 | 2.5 | 2.6 | 33 | + 4 | 6 | 12 | 2 | 0 | 10,000 | Liver puncture culture. |
| Means | | | 14.4 | | 68 | 13.4 | 2.58 | 4.21 | 33 | + 9 | 5.4 | 15 | | | | |

* P=palpable but less than an inch.

† Subsequently slightly irregular.

refused to allow a spleen or liver puncture before discharge.

Case No. 5.—This was a very weak emaciated boy who was scarcely able to sit up in bed. I had to give him the injections with extreme caution as regards dosage and interval. His temperature fell to normal for two days after the 4th injection, but rising occasionally up to 100°, it remained irregular throughout the course of treatment, only remaining normal immediately after this was discontinued. He made a particularly good recovery, as during the first half of the course of treatment I expected him to die at any moment. He lost 7½ lbs. in weight during the first month of treatment but gained 13 lbs. before discharge.

Case No. 6.—This was apparently a very early case running a high continuous fever.

Case No. 7.—This case was running a high intermittent fever which persisted until after the fifth injection.

Case No. 8.—This child appeared to be very ill; he had a high continuous type of fever which only occasionally showed slight remissions. The first few injections made no impression on this fever, but after the fourth it began to show signs of coming down and it remained below normal after the 6th injection.

Case No. 9.—This was a European girl who, though she has been suffering from the disease for some time, did not seem to be very ill. She vomited after the early injections so that the dose had to be increased rather slowly.

Case No. 10.—This was an extremely emaciated Anglo-Indian woman, aged 28, who had been suffering from the disease for about 18 months during which time she had received irregular treatment. She was apparently in a dying condition when she was admitted, but she improved considerably during the first few days in hospital, so that I thought that cautiously administered treatment with this compound would give her as good a chance as anything. She appeared to improve

either "von Heyden 471" or "urea-stibamine" will not be attempted. It is, however, quite obvious that this compound is far superior in the treatment of kala-azar to the antimony tartrates and that it compares very favourably with either of the above-mentioned drugs. The average time of duration of treatment was about a month and could undoubtedly have been reduced, had any attempt been made to press the treatment. It is also quite possible that the treatment was continued for too long a period, but we have not found spleen puncture during the course of treatment a very reliable indication of cure and have found it more satisfactory to allow a short period to elapse after the last injection before carrying out spleen puncture.

My thanks are due to Dr. Henry, of the Wellcome Chemical Research Laboratory, for providing me with so generous a sample of this compound and for the details of its antimony content and relative toxicity before despatch.

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Indian Medical Gazette.

JANUARY.

ALCOHOL.

THE *Practitioner* of October 1924 is a special number devoted entirely to the important subject of alcohol as an article of diet and a medicine.

Such authorities as Sir Humphry Rolleston, Sir Arthur Newsholme, Professor Starling, Sir James Purvis-Stewart, Sir Leonard Rogers, Sir Frederick Mott, Sir Richard Douglas Powell, Sir William Whitla and Sir Thomas Horder contribute to the number.

There is a general agreement on the disadvantages of alcohol when taken in any but the smallest amount. By Professor Starling it is regarded as a sedative and depressant drug, it is admitted to have a certain food value, but is regarded as an unsuitable and inefficient food. It can aid digestion only by its action in increasing the appetite. In concentrated form it is an irritant to the gastric mucosa and in any considerable quantity it retards digestion. It does not appear to be a real stimulant to any of the organs of the body, but in disease it may possibly be of value as an easily absorbed food stuff and as a sedative.

It is dangerous to persons exposed to cold as it increases heat loss, and in large amounts lowers the sensitiveness of the heat regulating centres.

Sir James Purvis-Stewart emphasizes its action in blunting the inhibitory centres of the brain, so that the person who consumes it becomes less critical of his own actions. In larger doses it inhibits other centres of the brain and causes loss of control. Used for long periods it causes an insidious deterioration of brain and body which may escape notice until an accident or illness occurs, but which may lead to neuritis, polyneuritic psychosis, etc. Sir Frederick Mott deals with the influence of alcohol in causing insanity. It is usually only a contributory factor and not the essential cause. Mott has found from experience that though alcoholics in hospital practice often suffered from cirrhosis of the liver, those in lunatic asylums seldom did so; altogether the association between alcoholism and insanity is not nearly so close as between alcoholism and certain definite structural changes in the organs of the body. There is, however, plenty of evidence of a state of mental deterioration due to chronic

alcoholism; not to speak of cases of suicide and homicide for many of which alcohol is responsible.

Dipsomania is in itself a definite form of mental disorder but is not a certifiable form of insanity.

Sir Richard Douglas Powell discusses the relationship of alcohol to life insurance, and comes to the conclusion that there is little evidence that amounts like $1\frac{1}{2}$ oz. of whisky or a pint of beer taken daily with meals will cause any symptoms which are recognisable even by expert examination. When taken in excess of these amounts it is possible to obtain definite evidence of harmful effects. Even small quantities taken frequently, although they may never cause intoxication, seriously affect a person's prospect of longevity.

The usual symptoms of such a form of indulgence are chronic gastric catarrh, morning retching, etc., in the more definite cases, but coated tongue, tremor of the tongue and hands should arouse suspicion.

The person who drinks to excess, only once a week to the extent of becoming slightly intoxicated, may suffer no appreciable damage except from his liability to accident during the period of intoxication.

Dr. Stevenson quotes the interesting opinion of Pearl who found that persons taking alcohol in small amount at any one time during the day and never enough to become intoxicated live somewhat longer than abstainers, while those who occasionally take alcohol to the extent of intoxication have a markedly higher mortality than moderate drinkers and abstainers up to the age of 60. Moore finds that abstainers as a class live considerably longer than non-abstainers.

Dr. Stevenson suggests that in certain countries the total abstainer is often a "crank," and that cranks may for various reasons have a smaller expectation of life than other persons. It would not be safe, therefore, to assume that the use of alcohol in small quantities is helpful, it may be positively harmful even though it be admitted that in certain sets of figures the strictly moderate drinker appears to have the advantage.

The article by Sir Leonard Rogers on alcohol in the tropics is of special interest. He points out that Europeans in the tropics drink more alcohol than Europeans at home, partly from social reasons, partly from the mistaken belief that alcohol is necessary.

He emphasizes the fact that alcoholics are very bad risks when they suffer from fevers, dysentery, cholera, sprue, heat-stroke, etc. He adopts a cautious attitude towards the question of the effects of the moderate use of alcohol. He comes to the conclusion that as alcohol has been found to predispose strongly to heat-stroke, hepatitis and liver abscess,

there is strong evidence that its habitual use is very far from being harmless. He strongly condemns the use of alcohol in the treatment of dysentery, cholera and snake poisoning; he adds that he does not know of any serious tropical disease in which its regular use is of value.

Its claims to value in the prevention of malaria and other tropical diseases are not based on any evidence.

Sir Leonard's discussion of the use of alcohol as a help to the maintenance of health in the tropics is most interesting. He cites his own experience which is that he carried out 27 years of strenuous service without taking alcohol in any form. Those who know the quantity and the brilliance of the work performed will find it hard to believe that the addition of alcohol or any other drug to Sir Leonard's diet would have resulted in a greater or better output.

Sir Leonard is not a bigot on the subject of alcohol, he admits that he does not know of any definite evidence to show that very moderate amounts of well diluted alcohol if taken with evening meal after sunset will do any harm.

Dr. Francis Harc deals with the treatment of alcoholism and strongly advocates apomorphine in maniacal drunkenness, during the paroxysm of dipsomania, and for insomnia following on the reduction of morphia or other drugs. The dose varies from one-tenth of a grain to one fortieth of a grain hypodermically, the smaller doses being suitable when the hypnotic action is desired.

W. McAdam Eccles summarizes the evidence against alcohol in a most convincing manner on the following lines.

Alcohol is a drug with narcotic action even in small doses.

Alcohol is not necessary to the healthy human being, it is definitely injurious to the growing child.

It is likely to become a "drug of addiction."

The immoderate use of alcohol is fraught with danger, physical, mental and moral.

The total abstainer can never use alcohol in excess nor can he suffer any harm from the use of the drug. Any moderate user may become an addict.

Alcohol is not a necessity, its moderate use is a luxury which is not free from danger.

Alcohol is a fuel food, but is a bad and unsafe food.

Alcohol is not a direct cardiac stimulant nor is it a digestive, except in an indirect manner by promoting a sense of well being which will

increase the appetite and enhance the normal processes of digestion. The opponents of alcohol regard this action of alcohol in promoting a sense of well being as one of the greatest dangers of the drug and as conducing to the formation of "habit."

The action of alcohol on the central nervous system is to deaden first the higher control centres and then in succession the lower centres. There is no evidence that alcohol can possibly increase physical or mental efficiency in health.

Altogether the valuable series of articles in the *Practitioner* contain little in praise of alcohol but much in blame.

In strict moderation the use of alcohol is a small vice which does little harm, and which, under certain circumstances may even have good effects, but on the other hand, every one knows how easy is the transition from moderation to excess. Every one knows how hard it is for the average youth to endure the ridicule which is poured on the total abstainer. The normal healthy person would rarely drink to excess, but for the pernicious "treating" habit which leads to the consumption of three or four times as much alcohol as would be taken if everybody bought his own drinks.

In a well known R. A. M. C. mess in India treating was forbidden except on guest nights, and the consequent reduction in the use of alcohol was very great.

The promotion of good cheer of good fellowship and the loosening of the tongue of those who are retiring and shy must be placed to the credit of alcohol, so must its action in helping to "eliminate" those who are deficient in self control, but can these advantages be obtained without the terrible drawbacks attending on the use of alcohol? The advocates and the opponents of alcohol have one common ground, they regard the moderate use of alcohol as being better than its excessive use, so that there can be no two opinions as to the desirability of introducing such legislation as is calculated to diminish the consumption of alcohol. Scientists would probably agree that absolute prohibition of alcohol would be greatly to the benefit of any country, but they are not agreed as to the effectiveness of any of the methods of prohibition which have been tried.

The great experiment which is being carried out in the United States will be watched with intense interest; the balance of opinion at present is that it has been a great success on the whole, though it has led to serious abuses in certain cases.

A Note to Readers.

We hope to publish the review of the Indian Medical year, 1924, in our next issue. It has been postponed to the February issue in order, as far as possible, to cover the whole of the calendar year 1924.

A Mirror of Hospital Practice.

A CASE OF FRAMBÆSIA IN THE NICOBAR ISLANDS.

By F. A. BARKER, M.B., B.Ch. (Cantab.),

MAJOR, I.M.S.,

Senior Medical Officer, Port Blair.

I AM not aware that any case of yaws has ever been reported from the Andaman or Nicobar Islands, and therefore the accompanying photograph of a definite case occurring in a native of Nankauri, one of the Nicobar Islands, is of interest.



The patient reported sick in October, when the R. I. M. S. "Minto" visited Nankauri harbour. The disease had commenced about 7 months before, and the primary seat was clearly an abrasion on the left knee-cap which was still in evidence. The primary eruption caused a good deal of itching, and the distribution of the eruption as seen in October suggests that it was spread by scratching.

Smears from the granulomata showed *Spironema pertusum* in abundance, and three injections, each of 0.5 grm. of Novarsenobillon have caused a rapid improvement in the patient's appearance.

The patient states that, though there is no other case in his village, the disease is very common in certain villages of Nankauri and the neighbouring islands. It has probably been imported by traders from Ceylon or the Malay Peninsula.

A CASE OF TYPHOID SEPTICÆMIA WITHOUT TYPHOID ULCERS.

By WILLIAM FLETCHER, M.D.,

and

J. E. LESSLAR,

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Federated Malay States.

ONE of the earliest lessons which used to be taught to the student in the post-mortem room was the diagnosis of typhoid ulcers, and questions about their distinguishing features were frequently asked in examinations. The association in one's mind between typhoid fever and the typhoid ulcer is so close that it is almost impossible to think of the former without visualizing the latter; yet mild cases of typhoid infection without intestinal ulcers are probably not uncommon. Severe typhoid fever without lesions in the intestine is extremely rare, but several instances of this anomalous form of the disease have been brought to notice. Recently Zweig (1922) reported the fatal case of a woman in whom a pure culture of typhoid bacilli obtained from the blood and organs after death and a positive Widal reaction were the only evidence of typhoid infection. The remittent temperature suggested septicæmia. Although the disease at the time of death had lasted a fortnight, no specific changes were found in the small or large intestine. Rehberg (1921) recorded an instance of typhoid septicæmia in a soldier, which was characterised clinically by extremely severe septic symptoms. Bacteriological examination of the spleen showed the presence of typhoid bacilli, but contrary to expectation no evidence was found in the intestine to confirm the clinical and bacteriological diagnosis of typhoid fever.

The usual course of events in typhoid fever is probably as follows. During the incubation stage the organism pullulates in the intestine and gall-bladder, and while this is taking place, the patient passes typhoid bacilli in his stools and becomes what is termed a "precocious" or "incubation" carrier. This condition is followed in some cases, though by no means in all, by an invasion of the blood and an attack of typhoid fever. The organisms are carried by the blood stream all over the body, where they multiply and produce lesions in certain peculiarly vulnerable positions, among which are the collections of lymph follicles known as Peyer's patches. In rare cases there appears to be a local immunity of the intestine, or the invading bacillus has no predilection for the lymphoid tissue of the ileum, and the disease runs its course as a septicæmia unaccompanied by the usual intestinal lesions.

The case which we record here is remarkable, not only as an instance of typhoid fever without intestinal lesions, but also on account of its bacteriological complexity, due to the occurrence of both agglutinable and non-agglutinable strains of typhoid bacilli, associated with mannite-fermenting dysentery bacilli, in the same subject. The patient, an old Chinese labourer named Quan Thin, was admitted to the District Hospital at Kuala Lumpur on March 11, 1922, with a temperature of 103°. He stated that he had been ill for a month. There were no physical signs of disease except a few coarse râles over the lungs. For the first ten days after his admission his temperature ranged between 99° and 103°F. During the following week it was seldom more than 100°, and subsequently it did not rise above 99°. After the patient had been in the hospital for six days he began to pass dysenteric stools containing blood and mucus. Subsequently to this he became rapidly worse and he died on April 1, two weeks after his admission and about six weeks after he was first taken ill. The temperature chart and the general condition of the patient suggested an attack of typhoid fever in about the fourth week of its course, and on March 20 Mr. Vimvalingam, the Assistant Surgeon in charge, sent the blood to us for examination. It agglutinated an emulsion of *B. typhosus* in a dilution of 1 in 7000 and *B. typhosus* was cultivated from it on the same day. Specimens of the stools, which contained blood and mucus, were examined on March 22, 27, 28, and 29, by plating them on Holt, Harris and Teague's eosin-methylene-blue agar, with the result that dysentery bacilli of the Flexner group, belonging to Andrewes' type X, were found on each occasion.

When the patient died on April 1, twelve days after *B. typhosus* had been cultivated from his blood, widespread dysenteric lesions were discovered. There was an acute membranous catarrh involving the whole of the large intestine and the last six inches of the ileum. To our surprise we found no typhoid ulcers nor enlarged Peyer's patches. There were two scars, evidently not of recent origin, just above the ileo-cæcal valve. They were deeply pigmented; one of them measured 2 cm. and the other 3 cm. in diameter. The gall-bladder was very slightly thickened and *B. typhosus* was grown from it in pure culture.

The question arose, at once, whether the typhoid infection was of recent origin, or whether the patient was a carrier in whom a general septicæmic infection had arisen from a nidus of organisms in the gall-bladder, which might have been in existence for months or even for years. It is possible that Quan Thin was a chronic carrier of *B. typhosus*, and the scars in the ileum may have been

the signature of an attack of typhoid fever which occurred long before; he told the medical officer that he had been very ill with fever a year before his final illness. Perhaps malaria and dysentery had lowered his powers of resistance to a point where the typhoid bacilli were able to invade the blood stream and produce a fatal septicæmia. On the other hand, it is possible that the case was one of typhoid septicæmia from the beginning, and that there had been, at no time, any typhoid lesions of the intestine.

The results of the bacteriological examination of this patient were unusual and interesting. It is seldom that an Asiatic pauper dies from a single, uncomplicated disease, and Quan Thin was no exception to the rule, for he died from the combined effects of malaria, dysentery and typhoid septicæmia. Subtertian gametocytes were found in his blood shortly after he entered the hospital, and the following strains of enteric and dysentery organisms were found in his blood, excreta and gall-bladder.

Organisms cultivated from the blood. *B. typhosus* was cultivated from the blood on March 20, twelve days before the patient's death. This organism was agglutinated by his own serum diluted 1 to 1200. It was agglutinated by the Institute stock typhoid serum to almost the full titre, but it was not agglutinated by dysentery antisera. When this strain of *B. typhosus* was sown on an agar plate, the resulting colonies were found to be of two kinds. About 60 per cent. were rough and granular, with irregular edges; the remaining 20 per cent. were ordinary clear typhoid colonies with regular, entire margins, showing a double contour when examined by transmitted light. The action of both colonies on the usual carbohydrate media, and on litmus milk, was that of *B. typhosus*. No indol was formed by either of the strains in peptone water. The individual members of the granular colonies were longer than those in the clear colonies. When they were grown in peptone water, the majority of the organisms in both subcultures were found to be non-motile, and there were fewer active bacilli in those made from the granular form. The striking feature of the granular colonies was that they were not agglutinated by a typhoid serum. Immune sera were made by innoculating rabbits. The serum prepared with the granular cultures agglutinated the smooth culture and also the type strain of *B. typhosus* at 1:5000, but it entirely failed to agglutinate the homologous rough, granular strain. The serum prepared with the smooth culture also failed to agglutinate the rough strain, though it agglutinated the homologous smooth and the stock cultures at 1:6000. Absorption of these immune sera, with the non-agglutinable rough strain, removed the specific agglutinin

for the smooth strain and for the type *B. typhosus*. The rough, granular colonies were therefore a non-agglutinable variant of *B. typhosus*.

Organisms cultivated from the faeces. Cultures were made from the faeces on March 22, 27, 28 and 29, with the result that dysentery bacilli of the mannite-fermenting group were isolated on each occasion and, when the patient died, dysenteric lesions were found in the intestine from the ileum to the anus. The organism possessed the usual characters of Flexner's bacillus. Acid was produced by it in milk within twenty-four hours, and the reaction became alkaline on the fourth day. Indol was formed in peptone water on the seventh day. An immune serum prepared with the bacillus had a titre of 1:1600 for the homologous organisms and it agglutinated Andrews' X strain to full titre. It was agglutinated by the patient's own serum diluted to 1:60. A detailed examination of this organism was made because, until this had been done, we thought that we might be dealing with the same non-agglutinable typhoid bacillus which had been isolated from the blood.

Organisms cultivated from the bile. *B. typhosus* was grown in pure culture from bile taken from the gall-bladder after death. It was agglutinated to full titre by the stock typhoid immune serum and by the sera prepared with the agglutinable and with the non-agglutinable strains isolated from Quan Thin's blood during life. It was not agglutinated by the serum prepared with the dysentery organisms isolated from the faeces. An immune serum, made by inoculating a rabbit with the bacillus isolated from the gall-bladder, agglutinated the homologous organism, the stock *B. typhosus* and the smooth strain isolated from the blood at a titre of 1:6000.

SUMMARY.

Two strains of *B. typhosus*, the one smooth and agglutinable, the other rough and non-agglutinable, were isolated from the blood of an old Chinese labourer, whose serum agglutinated a stock emulsion of *B. typhosus* in high dilutions.

B. dysenteriae, Flexner, type X, was isolated from his faeces on each of four occasions when they were examined.

The patient died about six weeks after the commencement of his illness. There was no marked thickening or inflammation of the gall-bladder, but an agglutinable strain of *B. typhosus* was cultivated from it. There were two old pigmented scars just above the ileo-caecal valve, but there were no typhoid ulcers.

It is an open question whether the patient was a chronic carrier and the septicæmia the result of infection from an old focus in the gall-bladder, or whether, on the contrary, the gall-bladder had become recently infected as a result of the general septicæmia.

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A CASE OF MUSCULAR DYSTROPHY, SCAPULO-HUMERAL TYPE.

By Dr. J. P. CULLEN, M.D. (Lond.), D.P.H.,
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THE accompanying photographs illustrate a comparatively rare condition, muscular dystrophy of scapulo-humeral type. The front view shews the extreme limit to which the



Fig. 1.

arms could be raised, the wasting of the deltoids and lower parts of the pectoral muscles, and the bony prominences around the shoulder joints. The prominences above the clavicles represent the superior internal angles of the scapulæ.

The back view shews the characteristic winging of paralysis of the trapezius. The modern view of these myopathies appears to be that,—with the exception of the pseudohypertrophic variety, which is probably a distinct entity,—the various forms described under the headings "Erb," "Landouzy,"

"Dejerine," etc., types, shew no sharp differences, and that no doubt exists as to their fundamental unity.

The term "juvenile," often applied to these cases, is occasionally inapplicable. In the present instance the man is aged 30 years, and

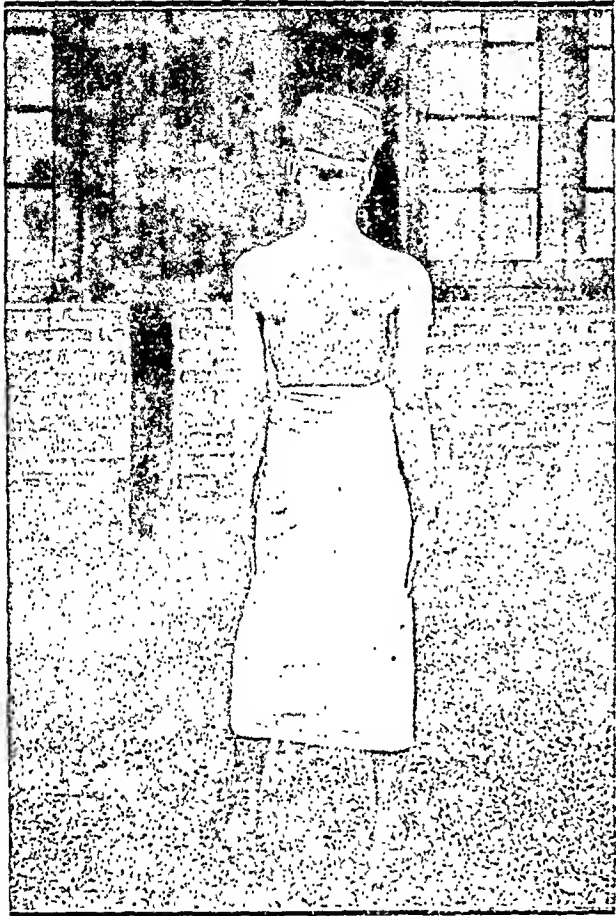


Fig. 2.

first noticed the weakness 6 years ago. No family history could be obtained.

A USEFUL HYPODERMIC OUTFIT.

By Dr. J. W. TOMB, O.B.E., M.D., D.P.H.,
Chief Medical Officer, Mines Board of Health, Asansol.

THE universal use of hypodermic medication now-a-days necessitates the possession by the physician of an outfit which will secure the minimum waste of time in its employment with the maximum of surgical sterility. This is particularly desirable where the alleviation of pain or the control of uterine hæmorrhage is the object in view.

The hypodermic outfits sold by the large manufacturing houses are not only costly and tedious to assemble and sterilise, but require very considerable care in transport, particularly in rural or colonial practice, if breakage is to be avoided.

In the outfit described below it is claimed that cheapness, immediate and constant readi-

ness for use, practical sterility, portability and security from breakage have all been equally and effectively attained.

The outfit consists primarily of a three-piece 60-minim Burroughs, Wellcome & Co.'s all-glass hypodermic syringe, with a platino-iridium needle, size No. 27. These sizes have been selected on account of their general utility. The syringe when originally assembled is sterilised by boiling in its metal case and is never afterwards taken apart. The platino-iridium needle is also originally sterilised by boiling, but on all subsequent occasions is sterilised by heating in the flame immediately before and after use. As an additional security against contamination and to preserve the point against injury the needle is kept in an empty sterilised hypodermic "Tabloid" glass phial of suitable size with the point of the needle directed upwards and embedded in the cork, a pledget of sterilised cotton wool being placed at the bottom of the phial.

The "lamp" consists of an ordinary 2 oz. glass-stoppered narrow-necked bottle filled with methylated spirit and provided with a separate (locally made) brass or other "burner" with a wick of twisted cotton strands. When the lamp is required for use the bottle is unstoppered and the burner, which sits loosely on the neck of the bottle, is inserted as in an ordinary spirit lamp. The spirit in the lamp is also utilised for disinfecting the skin of the patient at the site of injection, but where soap and water are at hand these may be used instead.

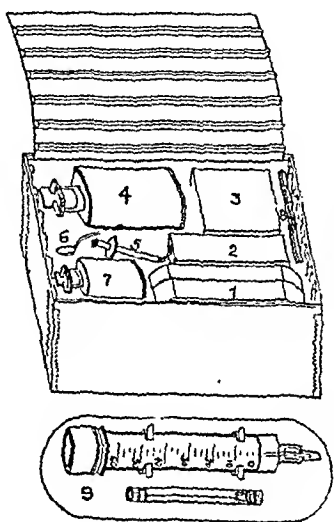
To wash out the syringe after use and at the same time to sterilise it and to maintain it constantly in sterilised condition and also to prevent the glass piston from sticking to the barrel, a mixture of equal parts of glycerine of carbolic acid and rectified spirit is provided in a $\frac{1}{2}$ oz. glass-stoppered bottle. The needle having been previously sterilised in the flame, five to six minims of this mixture are drawn into the barrel of the syringe on each occasion after use. The piston is then gradually withdrawn while holding the nozzle of the syringe upwards, so as to allow the mixture to escape and at the same time thoroughly to wash out and lubricate the whole barrel, the piston being subsequently replaced. A small tea-spoon is included in the outfit in which to dissolve the hypodermic tablets by boiling, and thus secure that none but sterilised solutions shall at any time be taken into the barrel of the syringe.

The tea-spoon may conveniently be omitted in town practice but will be found useful in rural practice in India. Water, however, need not be carried, as water of some sort is always available and is only used after boiling.

In the tropics it is often desirable to assist the cooling of the sterilised hypodermic solutions by immersing the tea-spoon to half its

depth in a little cold water in a saucer or other suitable vessel. Not more than 60 seconds are required for this operation, so that the delay is negligible.

The phials containing the hypodermic tablets are carried in a small cardboard box measuring $3\frac{1}{4}$ in. by $1\frac{1}{2}$ in. by $\frac{7}{8}$ in. which is packed with cotton wool at one end to prevent breakages. A second smaller "Vaporole" or similar cardboard box measuring $2\frac{1}{8}$ in. by $1\frac{5}{8}$ in. by $\frac{3}{4}$ in. also carried capable of holding three glass "Vaporole" capsules of hypodermic solutions such as pituitrin, ernutin, etc., for emergency use. To open these capsules a file from an ordinary "Vaporole" box is included.



1. Metal case containing syringe and needle.
2. Cardboard box containing tablet phials.
3. Cardboard box containing "Vaporole" capsules.
4. Bottle containing methylated spirit.
5. Bazar made burner with wick.
6. Tea spoon.
7. Bottle containing glycerine of carbolic acid and rectified spirit.
8. File.
9. View of syringe and needle in open metal case.

This whole outfit is contained in a stout cardboard box $7\frac{1}{2}$ in. long by 4 in. broad by $2\frac{1}{2}$ in. deep with a cover of the same material, which can easily be carried in the hand, bag, or great coat pocket the cover being secured on the box by an ordinary leather strap. The box is half filled with cotton wool to absorb shocks and to protect the contents from injury. As an additional protection against injury a layer of corrugated cardboard is also fitted around the inside of the box on all sides, a flap equal to the breadth of the box being left on one side which folds over the top of the contents underneath the cover.

For town practice the outfit, including the cardboard box, can be carried in a locally made leather case, or a stiff leather case thickly lined with felt and provided with suitable partitions might be substituted for the cardboard box.

A rough sketch showing details of the outfit is given above.

Corrigendum.—In our issue for last November, p. 571, in Dr. Huli Rao's notes on a case of imperforate anus, please read "there was no escape of faecal matter from the vagina" in the last sentence. We regret the oversight.—EDITOR, I.M.G.

Current Topics.

Medical Research Workers' Conference at Calcutta.

We have received the following report of the recent conference of Indian medical research workers:—

From time to time articles have appeared describing the special medical researches now in progress in the various medical research institutions of India; and the need for further medical research has been emphasised on many occasions. Recently a very interesting and informal conference of the medical research workers throughout India has been held in the School of Tropical Medicine and Hygiene, Calcutta.

This conference, which was convened at the instance of the Department of Education, Health and Lands, Government of India, assembled on the 27th October and its deliberations lasted three days. The Director-General, Indian Medical Service, Major-General R. C. MacWatt, C.I.E., K.H.S., I.M.S., presided and the Public Health Commissioner with the Government of India, Lieutenant-Colonel J. D. Graham, C.I.E., I.M.S., acted as Secretary. Through the kindness of Lieutenant-Colonel J. W. D. Megaw, I.M.S., Director of the School of Tropical Medicine, Calcutta, the delegates attending had the advantage not only of a comfortable meeting place, but also of the environment and appliances of the School of Tropical Medicine, which all the visitors were able to examine at leisure. The delegates, 32 in number, who assembled were representative of all the provinces of British India, of the Army, and of the medical research laboratories.

Major-General MacWatt in his opening address, after alluding to the value of such gatherings in the interchange of ideas amongst workers, referred to the great loss to the Medical Research Department by the untimely death of the late Major F. W. Cragg, I.M.S., who succumbed to typhus fever whilst on the typhus enquiry. After reviewing the work which the Association was carrying on with its limited income during the year, he outlined generally the programme of work which had been proposed for 1925-26, giving a brief financial résumé of the present resources of the Indian Research Fund Association and showing how the present researches and those proposed were able to absorb the income during 1924-25 and the anticipated income during 1925-26. In addition to special grants to institutions, such as the School of Tropical Medicine at Calcutta where two Professorships are paid for by the Indian Research Fund Association and a grant is given in aid of leprosy research, and after providing for administrative and contingent charges, the income available was able to finance 13 researches and it was hoped would finance 15 during the coming year. Present researches include those of the Kala-azar Commission, leprosy in its various branches, bovine tuberculosis at Muktesar, helminthology at Manbhar, lapsing and typhus fevers in the N. Provinces, sprue, bilharziasis, anti-plague vaccine, anti-venene at Parcel, Bombay, and indigenous drugs at the Calcutta School of Tropical Medicine.

It was pointed out that the crying needs of India in regard to extension of research work beyond the proposed programme could not be given effect to without further funds which were urgently required, and that a

programme of priority research such as that now awaiting attention would, when formulated, enable the Government of India to realise that the working spirit and necessity were there and that only money was lacking. The clamant need was for researches suitable for India, i.e., for such researches as dealt with the prevalent Indian diseases familiar to all, and the hope was expressed that owing to the quality and quantity of the teaching work now being done at the School of Tropical Medicine, Calcutta, the type of worker suitable for routine researches under expert direction would in time be available in numbers formerly unknown.

Further, the hope was expressed that as a result of the Conference, workers would return to their laboratories stimulated by contact with other research minds and that the time would not be far distant when part, if not all of the former grant-in-aid would be restored.

The proceedings of the Conference occupied the forenoons and afternoons of October 27th, 28th and 29th and during this period every opportunity was given to the delegates to explain the nature and progress of the several enquiries with which they happened to be connected, or which were proceeding within the areas they represented.

The enquiries proposed for the year 1925-26 were considered in detail, both from the research and from the financial points of view, and their merits were discussed with a view to framing suitable budget proposals for recommendation to the Scientific Advisory Board of the Indian Research Fund Association.

The researches which have been proposed for the next year include the continuance of the Kala-azar Commission and its ancillary enquiry in Calcutta, the continuance of leprosy research work under Dr. Muir and his assistants at the Calcutta School of Tropical Medicine, of the enquiry on lathyrism at Kasauli, of the three branches of the malaria enquiry, into Indian culicidæ, cinchona alkaloids and the administration of quinine, the continuance of the bovine tuberculosis enquiry at Muktesar, the continuance and enlargement of the scope of the helminthological enquiry in Bihar and Orissa, and of the research work on sprue, bilharziasis, anti-plague vaccine and anti-venene at the Bombay Bacteriological Laboratory and of that on indigenous drugs at the Calcutta School of Tropical Medicine.

As, however, it was recognised that this only touched the fringe of the research work necessary, even though it absorbed the whole of the present available income of the Research Fund, it was considered advisable to prepare a programme of priority research. This was done by a sub-committee whose findings were accepted by the Conference. Its report showed that at least five lakhs yearly should be spent on further research work on malaria, plague, cholera, dysentery, helminthiasis and on disease surveys and scientific examination and interpretation of vital statistics. The aspect of the application of the results of such research work to the prevention and treatment of disease was carefully considered by the Conference and valuable suggestions were embodied in its proceedings.

Briefly a very plain case was made out not only for the continuance but for the extension of medical research in India, and for its adequate financial support by the Central and Provincial Governments. It is hoped that by focussing the attention of the public on this matter of medical research in general and on the work immediately in progress in particular, further interest may be stimulated in the whole question, especially in its relation to the economic elevation of the Indian community.

Penta-trichomoniasis in Man.

A PAPER on this subject by Professor C. A. Kofoid and Dr. Olive Swezy in the January 1924 number of *The American Journal of Tropical Medicine* will be of considerable interest to laboratory workers in India.

On examination of over 25,000 stools from some 8,000 persons, *Trichomonas hominis* infection was found in 1.1 per cent. This figure is probably under the mark for the real incidence of the infection,—since the parasite tends to die out in the passed stool: and the authors claim that the best method of detecting light infections is to feed flagellate-free rats on such fæces,—a claim which appears at once to indicate their belief that infection may be acquired by swallowing the motile and vegetative phase of the parasite.

Dobell and O'Connor (1921) recognise three varieties of *Trichomonas hominis*, viz., *Tri-trichomonas* with 3, *Tetra-trichomonas* with 4, and *Penta-trichomonas* with 5 anterior flagella, but consider these to be only varieties and not different genera. The view taken by Kofoid and Swezy is that *Penta-trichomonas* is an entirely different parasite from the others. Structurally it shows six flagella, viz.:—(a) a group of four slender anterior flagella, arising at the anterior pole, passing forward, and beating in unison;—so much so that in the fresh state they may be mistaken for a single thick flagellum; (b) the prominent flagellum of the undulating membrane,—common to all varieties of *Trichomonas*; and (c) a sixth flagellum which arises from the anterior pole from the same basal granule as (b) and passes backward, free from and not attached to the body of the cell, along the margin opposite to that of the undulating membrane. This sixth flagellum has a rhythm entirely different from that of the anterior cluster of four. Further *Penta-trichomonas* freely ingests red blood corpuscles, whilst *Tri-* and *Tetra-trichomonas* do not; and there is evidence that it is pathogenic to man, whilst the other two are probably non-pathogenic.

Three cases are quoted of persistent and long-continued diarrhoea, where this organism was constantly encountered. One was an army officer who had had amœbiasis, but 19 consecutive examinations showed no amœbe. The second case was that of an army officer who also gave a history of amœbiasis previously, but 78 stool examinations failed to shew any amœbe. The third case was that of a school teacher resident for 18 years in the Hawaiian islands. There was no history of amœbiasis and no amœbe were found in 15 stool examinations. In all three cases the type of stool and the clinical condition were remarkably similar. The infection was resistant to treatment with emetine, bismuth emetine iodide and neosarsphenamine.

Trichomonas hominis is a very common intestinal parasite in India. At the Calcutta School of Tropical Medicine in the examination of 233 stools in 1922 from 185 patients, it was encountered 18 times. It is frequently present in the alkaline stools of the bacillary dysentery convalescent and has frequently been encountered in Calcutta with numerous ingested red blood corpuscles within it. It will be remembered that G. C. Chatterji in 1915 (*Ind. Med. Gaz.*, January, Vol. 50, pp. 1-9) described the prevalent type of *Trichomonas* in Calcutta as *Penta-trichomonas*, although he did not describe the independent rhythm of the independent sixth flagellum. He considered that it had a special association with dysentery and diarrhoea. Neither he, nor Kofoid and Swezy, however, appear to have excluded the possibility of the dysentery and diarrhoea as having been due to chronic Shiga or Flexner or other bacillary infections.

The authors note that *Penta-trichomonas* survives in rain and tap water for three days, and in normal saline for thirteen days. In common with *Tri-* and *Tetra-trichomonas hominis*, no cysts have been observed: and the authors suggest that infection may be acquired by swallowing the parasite in its motile phase. *Penta-trichomonas* can be cultured in 10 per cent. rabbit or human serum in Locke's solution at room and body temperatures.

The authors' suggestions as to the specificity and pathogenicity of *Penta-trichomonas* are interesting, but obviously further work and evidence are needed.

A Discussion on Post-Operative and Puerperal Mental Disorders.

At a joint meeting on January the 7th, 1924 of the sections of medicine, neurology, obstetrics, psychiatry and surgery of the Royal Society of Medicine in London, an interesting discussion on post-operative and puerperal mental disorders took place, and is recorded in the *Transactions of the Society* for April, 1924.

Dr. T. B. Hyslop, in opening the discussion, said that he did not think there would be much difference of opinion as to the importance of the role of heredity in the production of mental disorders occurring after surgical operations or in the puerperium. Mental factors of causation included anxiety, whilst in the case of puerperal disorder illegitimacy of the child was sometimes a determining factor. The influence of suggestion was also important; a woman who had had one attack of puerperal mania or melancholia should not be allowed to become pregnant again until the lapse of a sufficient number of years for her to have forgotten the previous experience. A curious fact was that a large proportion of those who suffered from puerperal insanity were brown-eyed. The acute febrile puerperal mania of septicæmic type which used to be seen fairly frequently in former days was now rare; (in India it is quite common). The types of puerperal insanity now commonly seen were (a) sub-maniacal; and (b) stuporose. Commonly they commenced during the night and seemed to be the outcome of the continuance of some dream-state. A most painful medico-legal question arose when a mother had killed her child during an attack of puerperal homicidal mania, and whose symptoms had subsequently cleared. She was adjudged "guilty, but insane" and ordered to Broadmore to await His Majesty's pleasure. He disagreed with the views expressed in the courts. A further point was the usual duration of puerperal mania and melancholia; he was accustomed to regard 6 weeks, 3 months, 5 months, etc., as fitting in with different types of the disease.

Sir Charters Symonds spoke from a personal experience in surgery of forty years. He could recall only four cases during that time where the mental disturbances resulted as a direct effect of operation, and all shewed different features. The first was one of mania in a patient aged 60, setting in after lumbar colotomy for malignant disease of the colon. The patient had had intestinal obstruction for a long time prior to operation; he recovered completely in six weeks' time, and died 18 months later from malignant disease,—the mental condition having been clear during the interval. Here intestinal toxæmia appeared to be an ætiological factor. The second case was a girl aged 20, suffering from suppurative appendicitis; the day after operation she developed mental disturbance, with singing and mild delusions,—the condition lasting 8 weeks. The third was an elderly, highly intellectual man, aged 76, also suffering from appendicitis, with frequent ejections of a brown fluid,—the patient himself inducing vomiting by applying the finger or a feather to the back of his throat. On the 8th day after operation he became excited with the mental balance upset, and refused all food. In three weeks' time he appeared to be *in extremis* owing to emaciation. A pint of saline was given subcutaneously into each axilla, and he passed a much better night. There was subsequently steady improvement and his mental disturbance gradually cleared. The condition was afebrile throughout. The condition did not appear to be one of simple senile dementia. The fourth case was a severe mental attack of mania in an excitable Jew, following on prostatectomy; yet—in his experience—prostatectomy in elderly men was often followed by improvement in the mental state, rather than the reverse.

At Guy's Hospital they saw every year cases of delirium tremens which came on after simple fractures of the tibia or fibula. The type of patient in this connection was usually a steady drinker, but one not accus-

ed to heavy alcoholic bouts. Their mental state remained normal until the accident occurred, whereupon delirium tremens set in. With regard to mental disturbance following pneumonia, the condition was usually transient, and removal to a mental home was not necessary. (The reviewer remembers the case of an elderly man convalescent from lobar pneumonia, who suddenly announced one morning when his breakfast was brought to him that he was the King of the Jews, and proceeded to throw his gruel at the nurse; he recovered with a fortnight's nursing.)

Dr. James S. Collier spoke from the experience of a surgeon with a large experience of cerebral surgery. In connection with tumours of the brain, mental reduction was common, but mental aberration was rare; even with lesions of the pre-frontal lobes, mental symptoms were for the most part completely absent. The very common and striking post-convulsive insanity seems never to occur from operations upon the brain, even though the brain may have been severely handled during operation. Meyer's theory that such post-convulsive insanity was due to traumatic oedema of the brain was probably wrong. He could recall only four cases in which operation upon the brain was followed by insanity. Three of them were almost identical; they were cases of tumour of considerable size situated in the central region of one hemisphere and the tumour was extirpated widely, part of the wall of the lateral ventricle being removed in the process. Shock was profound in all three cases, and mania of a violent type set in on the 3rd day, and persisted till death, which occurred within a fortnight. No family history of mental disturbance or other causative factor was present in any of the cases, nor was any obvious cause for death found at autopsy.

The fourth case was one of a large and long-standing tumour of the right occipito-temporal region; no attempt was made to remove it on account of its deep situation, but a decompression operation was done under hedonal anaesthesia. A week after operation the patient developed delusions and became suspicious, erotic and dirty,—finally becoming so troublesome that he was placed under certificate. Six months later he had recovered from all symptoms, and his mental state remained normal until his death some two years later from hæmorrhage into the growth.

Shock did not seem to be an ætiological element in these cases. In 1,985 cases of injury to the brain in warfare only 13 cases of insanity were noted, and in another series of 981 serious head injuries only 12 cases. Operations upon the brain were not in any way especially associated with the development of insanity, nor had he seen mental disturbance follow operations upon the pituitary, thyroid and adrenal glands. On the other hand he had seen three cases of melancholia follow removal of the prostate and also mental disorder following upon hepatic and renal operations associated with sepsis.

He did not think that anxiety and fear were potent ætiological factors; some of the afflicted patients were of the most stolid type. Nor did the severity of the operation appear to count, for it might follow upon the most trivial operation and yet not after severe cerebral operations. Nor did the nature of the anæsthetic appear to affect the issue. In fact post-operation mental disorder appeared to be as intangible a condition as non-hereditary insanity in general.

Mr. Aleck Bourne dealt with the ætiology and prognosis in puerperal insanity. He complained of the want of co-ordination in the study of this subject between gynaecologists and alienists. In all he had collected details of some 70 cases, and had studied them, especially from the point of view of ætiology and prognosis. Pregnancy in the single state might count as a factor—36 per cent. of 61 cases observed fell into this group. Physical disease was an important ætiological factor,—the chief organic disease associated with the condition being puerperal sepsis, and here the mental disorder sets in with the febrile state and may last for months

after the fever has subsided. Eclampsia was the next most important ætiological factor; and occurred in 9 of the 61 cases analysed. The character of the labour,—whether straightforward or difficult—did not appear to influence the mental prognosis, except in so far as sepsis was concerned. Primiparæ formed a much larger proportion than did multiparæ of the cases, 59 per cent.; and 27 per cent. of the patients gave a family history of mental disorder, whilst 4 were themselves epileptic. Anxiety appeared to him an important factor; one patient was exceedingly anxious as to the outcome of her confinement as she was suffering from phthisis, and another's husband had been reported as missing during the war. A third patient gave a history of transient mental disorder at the onset of puberty.

Turning to the time and mode of onset of puerperal insanity, of 70 cases observed, 4 developed during the later months of pregnancy, 6 became affected during labour, 39 cases in the first week of the puerperium, 18 during the second week, and the other 3 cases up to six weeks after delivery. The manner of onset was very similar in the great majority; after some nights of sleeplessness and incoherent talk,—showing usually some condition of deep-seated anxiety, delusions developed, whilst the mother might take a severe aversion to her baby. On the second day there was restlessness with a tendency to exposure of the person and to attack the nurses; by the third day the patient was frankly maniacal. Some, however, became stuporose and depressed or morbidly religious with intervals of weeping and singing hymns.

As to end results, of 58 patients of whom details were known, 13 had died from the effects of the mental disorder. The condition of puerperal insanity was therefore a serious one; it might be accompanied by both suicidal and homicidal tendencies. Of another 35 cases, 28 had been discharged "cured" or relieved,—of whom an occasional case had relapsed, and 4 were still under observation in asylums. The cases due to uterine sepsis did worst; those due to eclampsia recovered—most of them within a few weeks. The average time to recovery of the different types of cases was from two weeks to three years,—the eclamptic cases recovering very rapidly, whilst those whose recovery was slowest were cases where the underlying ætiological factors were obscure. In all, 77 per cent. of the cases investigated recovered mental health. As to recurrence of puerperal insanity in subsequent pregnancies, there was clear evidence that an attack in one pregnancy was very liable to be followed by an attack in a subsequent pregnancy; but cases due to puerperal sepsis or eclampsia did not come under this category.

Sir Maurice Craig spoke of nervous symptoms rather than mental disorder following upon surgical operations. Here a certain proportion of patients broke down after operation because of the emotional condition following on anxiety. To secure sound and refreshing sleep after operation was exceedingly important; the patient who slept well after operation did not develop neuroses; alteration of blood pressure was also important; he had seen three patients who had developed delirious maniacal conditions within 24 hours of the removal of a large abdominal tumour. Immediate saline infusions might here have a good effect. Some patients indeed seemed to become mentally afflicted as soon as they had a collection of pus anywhere.

Mr. H. J. F. Simson said that in private practice puerperal insanity due to puerperal sepsis could be eliminated, and from the point of view of general practice, the important class of case was the one with a hereditary history. Should women with a clear history of mental disease in the family be allowed to become pregnant? It was a difficult problem upon which to advise. If an obstetrician were asked to empty the uterus of a mentally unstable woman at the fourth month of pregnancy on account of the development of mental disorder, he might as well state that he would do it by the abdominal route, and at the same time section and divide both Fallopian

tubes. He agreed with Sir Maurice Craig as to the importance of securing sleep in threatening cases. There were two occasions during labour when sleep was especially necessary; during the first stage when the mentally unstable woman suffered from shock more than did the normal one; and secondly, for at least 48 hours after the confinement. In the former instance hyoscine and morphia might be indicated, in the latter bromides.

Dr. Carswell drew attention to the greatly diminished incidence of puerperal insanity during recent years; was it due to diminished puerperal sepsis? Not entirely; because there was an increasing tendency towards medical care and supervision of the patient during her whole gestation. Dr. Cuthbert Lockyer commented on the grave importance of sepsis in the ætiology of puerperal insanity. At present many cases of puerperal insanity were sent to the asylums to be looked after by alienists; but they were still obstetrical cases and needed the attention of an obstetrician. It was well known that cases following upon eclampsia got well, but what of the cases following upon puerperal sepsis? There was need for the co-operation of obstetric physicians and psychiatrists in the country.

Mr. Albert Carless, speaking as a surgeon with thirty years experience, said that there would probably be fewer cases of post-operative insanity if surgeons were not in such a hurry to get their patients out of hospitals and nursing homes. He had recently had his own appendix removed, and was much hampered at being obliged to leave the nursing home 15 days after operation. The most vivid case of surgical insanity which he had seen during the war was one where it was proposed to perform gastro-enterostomy on a private case. The patient was so much upset by the prospect of abdominal operation that he tried to cut his throat the night before the operation, and the specialist concerned earned his fee,—not by doing gastro-enterostomy,—but by stitching up the wound in the neck. A surgeon should consider not merely the operation about to be performed, but also the mental state of the patient,—a point too often neglected. Further, if an obstetrician should be attached to the staff of every asylum, a mental specialist should also be attached to the staff of every lying-in hospital.

In concluding the discussion, Dr. Hyslop said that it had been varied and of great interest. It must be recognised that certain patients were in a condition of what might be termed saturated nervous instability before operation; the mere removal of a tooth might here determine the onset of mental disorder. On the other hand, once the patient was frankly insane, surgical operations might actually affect him beneficially. As to hyoscine, it enabled one to knock the patient over, but the subsequent difficulty of recovery was great. The co-operation between surgeons, obstetric surgeons and mental specialists was very necessary; but if a start was made with one specialist of an outside subject added to the staff of every obstetric or mental hospital, where was the process to end?

However he hoped that the discussion had had fruitful and interesting results.

League of Nations: The Prevalence of Epidemic Disease and Port Health Organisation and Procedure in the Far East.

Report presented to the Health Committee of the League of Nations by F. Norman White.

GENEVA 1923.

ARE wars necessary? A prominent economist in a book published in 1914 said that among the great nations wars were unthinkable and impossible. The events of August of that year quickly proved him untrue but the present financial and economical conditions of most of the belligerents support the truth of the arguments on which his conclusions were based. More and more humanity is becoming an organismal unit. Variations

in climates and soils, the distribution of minerals, the development of means of rapid communication and information are all tending to make humanity a collection of communities in which none is self-supporting but in which all are mutually interdependent. Greed, rapacity and envy will make differences and quarrels but these should not be allowed to disturb and disrupt the organism by wars. To bring this consummation nearer and to spread and propagate these ideas, the League of Nations was formed. With this side of the League medical men have more than a passing interest but it is with the more belligerent activities of the League that we are more concerned. War against parasitic disease is not a local affair but must be made universal and co-ordinated. The direction of this campaign is entrusted to the Health Committee of the League of Nations. Much work on epidemic disease has been already done on the continent of Europe but the present report represents the preliminary reconnaissance of a more ambitious campaign. The low forms of life whose parasitism on man produce the chief epidemic diseases, plague, cholera, and small-pox flourish in the hot moist climates of the tropics from whence these diseases spread by human intercourse, railways and shipping. The mission undertaken by Dr. Norman White to the Far East was to enquire mainly into the following questions:—

(1) The incidence of the more important epidemic diseases in the Far East ports and adjacent territories, their endemicity, the sources and modes of re-infection, and the means in force for their prevention.

(2) The part played by shipping in the spread of infection.

(3) The quarantine regulations in force and their results in practice.

(4) The possibilities of making information regarding the chief diseases more readily accessible, and devising a scheme for interchange of such information.

By the International Sanitary Convention of Paris an attempt had already been made to draw up a uniform code of rules regarding the measures to be taken in regard to the spread of disease by shipping. The nations signatory to this convention were nearly all European, however, and the regulations referred mainly to the prevention of infection reaching European ports with little regard to the preventive measures to be taken at the port of departure. It has been abundantly evident that the latter measures are by far the most important in the suppression of ship-borne disease. Dissatisfaction has been expressed therefore with these rules and their revision is contemplated. One main object of this Far East mission was to enquire into the feasibility of adequate enforcement of uniform and adequate rules at all ports of departure to reduce the risks of ship-borne epidemic disease to a minimum. With such rules in force, the necessity for elaborate regulations and procedure at ports of call would be greatly reduced.

The writer of the report visited most of the ports of the Far East and the report embodies the conditions he found and his conclusions. He has wisely avoided a very large report but has given a bird's-eye view of sanitary conditions in the ports and countries visited. His criticisms and suggestions are helpful and valuable. The report reveals the extent of endemic and epidemic disease throughout the Orient, and how much of this could be prevented by suitable and not by any means impossible measures, especially at ports of departure. Dr. Norman White's observations on plague are as might be expected very interesting and illuminating. The history of the plague since 1894 is an instance of the slow but sure carriage of disease by human intercourse, but he focusses attention on the fact that it is merchandise and particularly grain which is the carrier and not man himself. Measures designed for plague prevention and control, both municipal and international, have been largely directed against the human case and his contacts and have therefore not only been largely futile but have repelled the co-operation of the people

who suppress information regarding rat mortality, etc., for fear of sanitary reprisals. 75 per cent. of plague cases are one per house cases and isolation, destruction of clothes, disinfection of bedding and room, and segregation of the contacts—the usual municipal measures—are not only irksome but largely unnecessary and useless. Similarly a ship with a cargo of rice from a plague port is possibly much more dangerous than a ship with a case of human plague on board, but at present the latter is subjected to many regulations, the former being ignored.

The writer reviews the epidemiology of plague and its geographical distribution with regard to the variety of rat and rat fleas. *Xenopsylla* would seem to be the only genus of flea carrying plague to man, but many more observations and investigations are necessary to clear up the relative malignancy of *X. cheopis*, *asia* and *brasilensis*. In French Indo-China the musk-rat is stated to have been found infected with plague but these observations would seem to require repetition and confirmation. This rat has not been found infected in India. Absence of human plague is usually taken as indicating comparative absence of a rat epizootic, and anti-rat measures and observations and investigations of rat mortality in such places are neglected. There is great danger in such a course. The amount of human plague is not by any means necessarily an index of the rat plague epizootic. Where conditions favour a large rat population and especially where there is grain traffic, continuous observations of rat mortality should be carried out and anti-rat measures pushed instead of being abated even if there are no human cases. The revised international sanitary convention rules will be drafted on sounder lines than the old.

The constructive proposals put forward in the report include the formation of a sanitary convention for countries of the Far East, the signatories to which would agree to certain procedure in their own ports and lines of action in the case of shipping proceeding from and arriving at ports. Special stress is laid on the importance of preventive action at the port of departure instead of at the port of arrival. This is essentially sound. A distinction is drawn between "bubonic" and "pneumonic" plague as being two distinct diseases. Dr. White suggests that *B. pestis* in pneumonic plague is not the only causal factor but that symbiosis with some unknown organism is necessary. We are not aware of any experimental grounds for this statement which is based on the analogy of the part played by the pneumococcus in influenza epidemics. A sanitary convention, as proposed immediately supposed the establishment of a central epidemiological intelligence bureau, which the report suggests should be located at Singapore—precise information is the first essential for sanitary action. Telegraphic information of disease in signatory countries and ports would be sent to Singapore from whence such information would be telegraphed to signatory governments. The bureau would report annually to governments and to the League of Nations, and would become an important centre for the dissemination of epidemiological knowledge, for the standardisation of quarantine procedure and for the control of communicable diseases generally. A large part of the report describes the conditions during the last 5 years so far as communicable disease is concerned in Far East countries and the descriptions are of great interest. The writer's style is fluent, clear and pleasant to read. So far as India is concerned, the writer notes the improvement in recent years in regard to questions of port health procedure and equipment. There is need for well equipped quarantine stations at Indian ports and these will no doubt materialise when the revised international sanitary convention is agreed to.

There is much more matter of interest in the report which should be read by all interested in the co-ordination of sanitary effort. The great reduction of cholera throughout the East in 1920-22 is noteworthy; in many places it is ascribed to mass inoculation with cholera

vaccine—the absence of reaction makes this a much more feasible measure than in plague.

Small-pox is widespread in the Far East, but is perhaps not so prevalent as conditions of living and the constant presence of infection would lead one to suppose. Provision for primary vaccination is made in practically all countries and in the ports is fairly efficiently carried out. In Japan alone is re-vaccination compulsory, although in the Dutch East Indies many of the population are re-vaccinated. The most noteworthy small-pox epidemic of recent years occurred in the Philippines in 1918-19. Local administration had been lax in the preceding years and primary vaccination had been very imperfectly carried out. In 1919 fifty thousand fatal cases of small-pox occurred and nearly 90 per cent. of the cases investigated were children who had no marks of primary vaccination. The constancy of the seasonal prevalence of small-pox in the Far East is remarkable. Three-fourths of fatal cases occur in the first half of the year.

Indigenous Drugs.

In an article in the *China Medical Journal* of August 1924, B. F. Read, M.C., of the Peking Union Medical College deals in a most capable manner with the subject of Chinese indigenous drugs.

Apparently the problem in China is much the same as that in India and it is interesting to notice how it is being dealt with. Many standard drugs can be bought at a national drug fair which is held twice a year at Chichow in North China; the prices of such articles as rhubarb, orange peel, gentian and castor oil are much lower than those of the imported articles. In the case of these there is no reason for importing foreign drugs at all. The next class of drugs dealt with are substitutes, viz., drugs which can take the place of imported drugs whose actions are similar. The use of these substitutes will diminish bills of cost very greatly without any loss of efficiency.

The third group is a varied one, it consists partly of Chinese drugs whose composition is well known, but which have not received serious attention, partly of drugs which are well known in the West but which have been discarded because of their feeble action, and partly of drugs which need investigation. The order in which the scientific examination of these drugs takes place is:—

- I. Identification by a trained pharmacologist.
- II. Extraction and chemical analysis of essential principles.
- III. Physiological testing.
- IV. Clinical trial of drugs which are found to be of potential value.

The author realises the need for caution in work of the kind, he points out that undue optimism and exaggerated claims only serve to put back the clock of scientific progress.

It is interesting to notice that work in China is following on the same lines as have been adopted in the pharmacology department of the Calcutta School of Tropical Medicine. It is only by patient scientific work of the kind that indigenous medicines can be made available at cheap rates. There are doubtless many drugs in use by the practitioners of indigenous systems of medicine which have their value. That there are any drugs which will prove to be serious rivals of quinine, salvarsan and the like is extremely improbable, but even if research into indigenous drugs should not reveal any epoch-making remedies, it will at any rate provide us with definite knowledge as to the possibilities of obtaining active remedies at cheap rates in this country. It is quite useless to force people to use a drug merely because it is of indigenous origin. It must be as good as the imported drug and also as cheap, for if it is dearer the truly economical procedure is to sell to the foreigner something that we can produce more cheaply than he can and then to buy from him the drugs which he can produce more cheaply than we.

Nothing can do more harm to the economic development of a country than to insist on keeping its labourers employed on work which does not pay.

Tryparsamide in Neuro-syphilis.

LORENZ and others in the *American Journal of Medical Sciences*, of August 1924, report the results of the use of tryparsamide in 185 cases of syphilis of the nervous system. The drug combined with mercuric salicylate was effective in early cases of G. P. I. and meningo-vascular syphilis. In lobar cases it was less successful. Visual troubles occurred in 7 per cent. of all the cases treated and in 23 per cent. of the cases of tabes. These cleared up in nearly all cases after withdrawing the drug.

Treatment of Encephalitis Lethargica.

STERN, in the *Medizinische Klinik* of Berlin for July 27th, 1924, advocates the use of 50 to 80 c.c. of serum from convalescent patients given intramuscularly. Only 1 case out of 27 died and sequelæ were entirely prevented. The treatment unfortunately is only practicable when convalescent patients are available.

Treatment of Pruritus Ani, Vulvæ et Scroti

DR. M. P. MOORE of Asheville N. C. in the *Journal of the American Medical Association* of September 6th, 1924, describes a new method of dealing with these distressing complaints. He thoroughly infiltrates the skin and subcutaneous tissues over an area exceeding the surface affected, by 0.5 per cent. quinine and urea hydrochloride solution. Anaesthesia is at once produced and the skin becomes smooth in a few days. Sometimes a second application is needed after one to several weeks and in a few cases a third treatment is required. After sterilization of the part, a small area is anaesthetised by 1 per cent. procain and then the quinine and urea solution is used to infiltrate the tissues until the patient feels as if he were sitting on a cushion. It is advisable in most cases to give a preparatory dose of a quarter of a grain of morphia hypodermically to prevent after-depression. Not more than 10 c.c. of 1.0 per cent. solution of procain should be used, but up to 200 or 300 c.c. of the quinine and urea solution may be used.

Domestic Estimation of Urinary Sugar.

British Med. J., September 20, 1924, p. 504.

DR. F. C. EVE, Senior Physician, Royal Infirmary and Victoria Hospital for Children, Hull, describes a method whereby the diabetic patient can measure the daily variations in excretion of sugar. This is necessary for treatment by dieting; it is indispensable if insulin is employed.

The method, though rough and ready, has been found adequate and reliable.

METHOD.

Apparatus required.—(1) Urinometer, reading 1000 to 1040, in a packable form. (2) Yeast, fresh every few days, costing a penny. (3) Thermos flask (one pint). (4) An engineering students' book of squared paper. Every night at bedtime the patient washes out the thermos flask with very hot water, and then passes his urine into it. He adds a lump of yeast about the size of a hazel-nut, gives the mixture a good shake, and corks with cotton-wool. In a few hours, less than twelve, at blood heat, any sugar present will have been destroyed by the growing yeast, chiefly by oxidation, into carbonic acid. The specific gravity of the urine after fermentation will be reduced to an extent proportional to the amount of sugar originally present.

Charting.—The squared copybook is graduated from 1000 to 1040 in its left-hand margin. Every half-inch of the upper margin represents a day, and is numbered with

the day of the month. Every night at bedtime the specific gravity of the warm, freshly passed urine (say 1040) is charted with a black dot; next morning the specific gravity of this same warm specimen is again measured, and perhaps has now decreased to 1018 owing to the destruction of the sugar. A red dot is placed at 1018 vertically below the black 1040 dot. Next day another pair of dots will be placed in the next vertical column, and thus two curves will be spun out which may be connected by a thin line, as in a temperature chart. The black curve will show the daily variations of the specific gravity of the urine; and the red curve will show the daily specific gravities after the contained sugar has been destroyed. The object is, by diet and insulin, to make the space between the two curves as small as possible. For obviously, if the urine never contains sugar, there will be no space between the two curves—that is, they will be superposed.

Reviews.

OPERATIVE SURGERY, COVERING THE OPERATIVE TECHNIC INVOLVED IN THE OPERATIONS OF GENERAL AND SPECIAL SURGERY.—By Warren Stone Bickham, M.D., F.A.C.S. In six octavo volumes, totalling about 5,400 pages with 6,875 illustrations. London and Philadelphia: W. B. Saunders Co., Ltd., Vol. I., pp. 850. Vol. II., pp. 877. Cloth, 50s. net per volume.

Books on operative surgery differ widely in their character according to the class of readers to which they are addressed. Those intended for students are usually unpretentious works, restricted mainly to the classical operations which figure so frequently in the examination room and so rarely in the operation theatre. Those intended for practitioners and young surgeons form a class of which there are several fine examples in the surgical literature of this country. They crystallise the author's experience of what is best to do and how to do it, the views of many surgeons are discussed and criticised, leading us to the author's own views and the description of his favourite technique, followed by briefer descriptions of alternative methods. Such books are usually the work of one man, whose individuality colours every page of the text; they make the personal appeal of the teacher and one turns to one's favourite book for counsel in difficult cases, as to a tried and trusted friend.

The work before us is of a totally different character. It is of colossal proportions, covering the whole field of surgery, including all the special branches; it is the work of a single writer and it deals with operative technique alone. There is no discussion whatever of the indications for operation, of the merits of different procedures or of the after-treatment and the results. Opinions may differ as to the utility of such a work, but criticism may not be based on this ground, since by his sub-title and in his preface, which he adjures us to read before we criticise, the author explains what he has set out to do and what he does not try to do. He tells us that he sets out to describe the common operations only, but he has gone much further than this, for there are few recognised procedures of modern times which will not be found in these pages. We confess to astonishment at the colossal industry which must have gone to the making of this book, together with admiration for the manner in which the author has maintained an even standard of treatment, which must have been very difficult when dealing with subjects in which he was not specially interested. We venture to guess that the surgery of the brain and spinal cord appeal to him more than the other branches dealt with in these two volumes, the treatment of this subject seeming to us to be on less stereotyped

lines, but we may have to withdraw this opinion when we have seen the other volumes on regional surgery.

Vol. I deals with general surgical technique, including anaesthesia, general and local, plastic surgery, amputations and excisions. The account of each operation is preceded by a systematic description of the surgical anatomy of the parts and surface landmarks. The descriptions of operative procedures in this volume are mostly on orthodox lines, but we commend to the reader the chapters on prostheses and on cineplastic amputations and their appropriate prostheses. The latter subject is one on which information is difficult to obtain at present, it is undoubtedly the method of the future for the upper limb, and the account here presented is both adequate and interesting. Osteoplastic and aperiosteal amputations are known in this country, they too offer a field well worthy of investigation. Apparently the author felt himself bound to describe all the recognised amputations, but we regret that he has seen fit to ignore the lessons of the war, which have rendered obsolete most of the amputations described, and that he has omitted all reference to the "seven-inch stump" amputation of the leg which has proved so useful. The modern light artificial legs of aluminium, being an American invention, should surely find mention in this book. Gillies' work on epithelial inlay grafts is a surprising omission from the otherwise excellent section on plastic surgery.

Vol. II includes operations upon the blood vessels, lymphatics, nerves, bones, muscles, tendons and joints (excluding excisions), together with the first two sections of regional surgery,—operations on the brain and spinal cord. It is almost hypercritical to refer to small omissions, but we find no reference to the use of pedicled muscle flaps in filling a bone cavity, or to the method of secondary nerve suture in two stages, the nerve being dissected out and the ends brought as near together as possible in the first stage, the process being completed at the second operation, a method vastly superior to such antiquated devices as turning down flaps of nerves, shown by war experience to be absolutely useless. Parham's bands of flexible steel have established their position in the operative treatment of fractures and should be mentioned. The anatomical sections in this volume are very repellent, long catalogues of structures in relation with each other, redeemed however, by the excellent illustrations. The sections on the brain and cord are unusually good. We were much struck with the value of a series of tables and diagrams; presenting the relations of the spinal segments and nerve roots to the bodies and spines of the vertebrae, another of the segmentary motor distribution, and a third showing the symptoms of cord lesions at all levels. These data will be found very useful by surgeons who have to operate on these difficult cases.

The book is one which will appeal mainly to specialists as a work of reference, but it is a great conception finely carried out, on which we congratulate the author very heartily. It remains only to add that the printing and paper leave nothing to be desired and that there is an abundance of excellent illustrations.

W. L. H.

THE DISEASES OF THE BREAST.—By Willmott H. Evans, M.D., F.R.C.S., Consulting Surgeon to the Royal Free Hospital. London: University of London Press Ltd., 1923. 495 pp. with 106 illustrations, of which 15 are in colour. Price 27/6 net.

So much work has appeared in recent years on carcinoma of the breast that a new monograph on the diseases of that organ is certainly needed. The present volume, though it incorporates all the newest work, suffers from a diffuseness of style which at times wearies the reader. However interested the author may be in congenital anomalies and in atrophy and hypertrophy of the breast, he is hardly justified in devoting nearly 30 pages and 14 full page illustrations to these subjects. On the other hand we find the very important subject of chronic

mastitis dealt with in 8 pages with only one illustration. Cysts of the breast are a constant source of difficulty in diagnosis, but these interesting conditions are all dealt with far too briefly. Nearly half the book is devoted to the subject of carcinoma and full justice is done to Handley's work on the method of spread of the growth and the indications furnished thereby for the very extensive operations now performed. The whole subject is dealt with in great detail, but it is surely unnecessary in a work of this character to give lists of the instruments required for excision of the breast, nor does one expect to find directions for sterilising instruments and ligatures. The remarks on the preliminary incision in chapter 35 might well include a description of the naked eye appearances of the various conditions likely to be met with in doubtful cases, since it is on these that the operator, especially if located in foreign parts, will in most cases have to make up his mind what he is going to do. Secondary operations, after the pathologist's report is received, are not popular in India and the examination of frozen sections cut during the operation has not as yet gained a footing in this country.

The illustrations, all full page drawings, many of them coloured, are a special feature of the book. They are culled from various sources, ancient and modern, and indicate the author's deep erudition in his subject. Many of them are reproduced from old books and illustrate conditions which are practically never seen in Europe nowadays. They will be of interest to surgeons in India, the land where the neglected tumour is only too often seen. The excellent anatomical figures in chapter I would be improved by the addition of reference lines and names to all the structures shown, and we consider that the operation of excision of the breast should be illustrated by a few figures. The author has evidently devoted a considerable amount of labour to the preparation of this monograph and we have pleasure in recommending it to practitioners.

W. L. H.

DIAGNOSIS AND TREATMENT OF ACUTE ABDOMINAL DISEASES, INCLUDING ABDOMINAL INJURIES AND THE COMPLICATIONS OF EXTERNAL HERNIA.—By Joseph D. Adams, M.B., M.S., F.R.C.S., pp. x and 558, with 46 figures. London: Baillière, Tindall & Cox, 1923. Price 16/- net.

TEN years have elapsed since the first edition of this book was published, but the surgery of abdominal emergencies has changed very little. In the former edition Dr. Cassidy collaborated with Mr. Adams and the book was somewhat of a novelty in that many conditions which are in the province of the physician, but which may nevertheless give rise to difficulty in diagnosis were considered, and instructive details of actual cases in which laparotomy was performed on a mistaken diagnosis were given. Although Dr. Cassidy has not assisted in the preparation of this edition, much of his contribution remains, so that the book is unaltered in character. Each section is complete in itself, which, though it leads to rather wearisome repetition in the accounts of symptoms and treatment, has yet the advantage of saving much cross-reference and enhances the value of the work to the practitioner.

The work is extremely practical, the symptoms and differential diagnosis of each condition are given with meticulous care and accuracy and with due regard to brevity. The treatment recommended is thoroughly sound and in accord with the views of the majority of British surgeons. We think, however, that in dealing with appendicitis with localised peritonitis (or appendicular perityphlitis as the author prefers to call it) the methods of Ochsner, which are steadily gaining ground in the United States, merit discussion. The chapter on intestinal obstruction is in our opinion the best and most complete in the book; it includes a useful table showing the frequency with which the various lesions were met

with in a series of 500 cases at St. Thomas's Hospital, ranging from 197 cases of intussusception to one case each of carcinoma of the small bowel and pressure from outside the bowel, and it is in this order that the individual lesions are considered, a most useful method for the young operator, leading him to look for the most likely things first. Mummery's method of "blind" cæcostomy in carcinoma of the colon is not discussed, which we think regrettable, as this method is much safer for an inexperienced operator than extensive exploration in patients who are in the grave condition to which such cases usually drift in this country before they are brought to hospital. Irrigation of liver abscesses by Roger's sheathed cannula is not now used in the treatment of amœbic abscesses, repeated aspiration and the administration of emetine being found to give perfectly satisfactory results.

The injection of calcium salts intravenously and intramuscularly as a precaution against hæmorrhage in operations on jaundiced patients might well be mentioned in the sections on operations on the biliary passages. Apart from these few criticisms, we consider this a good and useful book and we have no hesitation in recommending it to practitioners in this country as a sound guide in a difficult class of case. The paper, printing and binding are excellent and the price is moderate.

W. L. H.

THE SCIENCE AND ART OF ANAESTHESIA.—By Colonel William Webster, D.S.O., M.D., C.M. St. Louis: C. V. Mosby & Co., 1924. Price \$4.75. Pp. 214.

THE author's intention is to provide a small, concise manual on the subject of anaesthesia for the use of the general practitioner and medical student, and the book admirably fulfils the purpose for which it is intended.

The first chapter is devoted to a very interesting résumé of the history of anaesthesia. The physiology of anaesthesia is clearly dealt with, and in subsequent chapters the chief anaesthetic agents and their administration are described, that on ether, and its great advantages being particularly full.

The selection of the anaesthetic agent and its bearing on the nature of the operation and surgical shock is very instructive. In describing pre-operative and post-operative treatment the author rightly points out the fallacy of the time-honoured drastic purgation on the night preceding operation. The patient's viewpoint is sympathetically treated, and we venture to suggest should always be kept in mind by those who administer anaesthetics. This book is published by C. V. Mosby Company, in clear, large type and is of handy size. The book is very readable and although short, presents clearly the salient features of anaesthesia.

SPINAL ANALGESIA.—By F. R. Parakh, M.D., B.S., M.R.C.S., Honorary Consulting Surgeon, Parsi General Hospital, Surat, Chief Medical Officer, Parakh Hospital, Bombay. Bombay, 1923, pp. 92.

THIS little booklet opens in rather an unusual manner with a condensed table of the author's 229 cases operated upon under spinal anaesthesia, with 6 deaths, none directly attributable to the anaesthesia and only 3 cases in which there was failure to produce analgesia. The author then proceeds on the usual lines, detailing the history of the method, advantages and disadvantages, technique, indications and contraindications, etc. The author is temperate in his views and makes no exaggerated claims for the utility of the method, as do some of its continental advocates. In patients suffering from severe injury with shock, in urgent abdominal cases, in bladder and rectal surgery and above all in cases where, by reason of some general disease, the administration of a general anaesthetic is fraught with grave danger, it is the method of election.

The book is somewhat overloaded with quotations from authorities but for those who desire an introduction to a method which deserves to be more widely employed in India than it is at present, it should prove useful.

LOCAL ANAESTHESIA, ITS SCIENTIFIC BASIS AND PRACTICAL USE.—By Professor D. Heinrich Braun. Translated and Edited by Malcolm L. Harris, M.D., Professor of Surgery, Chicago Polyclinic. Second American edition from the sixth revised German edition. Pp. 411 with 231 illustrations in black and colours. London: Henry Kimpton, 1924. Price 25s. net.

WHEN the first English edition of this book appeared in 1914 the present reviewer had the pleasure of writing the notice of it for the *Indian Medical Gazette*. Local anaesthesia was at that time widely practised in Germany, but hardly used at all in England except for anaesthesia of mucous membranes. That such extensive operations as resection of a thyroid lobe or an exposure of the brain could be performed under local anaesthesia excited surprise amounting almost to incredulity, unaccompanied by any desire to imitate these feats. Times have changed, however, and "field block" and similar procedures are now widely advocated in America and even in England the field for this work is steadily increasing. Procedures which were surprising innovations when the first edition of this book was published are now commonplace and every surgeon must now know how to utilise the method in suitable cases.

The book has always been noteworthy for the "scientific basis" sections and in this new edition we find many chapters devoted to the experimental work by which the properties of the local anaesthetic agents were studied. On the practical side it has been brought well up to date, the newer methods such as parasacral conduction anaesthesia are well described and illustrated, and there is a systematic section in which all the main operations will be found arranged according to regions with directions for the appropriate form of anaesthesia for each.

A section on toxic effects following the injection of novocaine is useful, as one is apt to forget that even this relatively non-toxic agent may have dangers when in strong solution.

Many new illustrations have been added, but they are mostly reproductions of photographs and are inferior to the old blocks.

Braun's book was the first standard work in this field, its reputation is well maintained by this translation of the latest edition.

DISEASES OF THE NOSE, THROAT AND EAR FOR STUDENTS AND PRACTITIONERS.—Edited By A. Logan Turner, M.D., F.R.C.S.E. With 222 illustrations and 12 plates of which 8 are in colour. Pp. 413. Bristol: John Wright and Sons; London, Simpkin Marshall & Co., 1924. Price 20s.

THE late Major W. G. Porter's unpretentious work on Diseases of the Nose, Throat and Ear was a well known and popular work, addressed mainly to general practitioners, which was favourably noticed in these columns some years ago. The present volume dedicated to his memory, is the joint work of those engaged in the teaching and practice of the speciality in the Edinburgh Medical School. The book has been considerably expanded and has been rendered more useful to students by the introduction of an illustrated description of the clinical anatomy of the various regions.

Detailed accounts of most of the minor operations and of the more common major ones have been added and should prove useful to practitioners. Sections on bronchoscopy and oesophagoscopy are intended to furnish the reader with the indications for the use of these methods rather than to instruct him in the details of

those highly technical procedures. Throughout the book the main objective has never been lost sight of, to assist practitioners to deal scientifically with all the common affections and to recognise the rarer conditions which require reference to a specialist. The book is not written for the latter, and therefore theoretical and controversial questions are left on one side, the treatment of the subject being elementary except in the sections on the internal ear, where the complex nature of the subject has compelled some departure from this rule. The directions for treatment are clear and practical if a little didactic in places, the collection of formulae which was a feature of the old edition has now been expanded and forms a useful appendix. The book as a whole has been greatly improved by the additions, it is easy reading and meets the requirements of practitioners exactly: we have great pleasure in recommending it.

CLINICAL EXAMINATION OF THE EAR, NOSE AND THROAT.—By Bhagwan Das Uberoi, M.B., B.S. Published by R. L. Suri, The Students' Own Agency, Anarkali, Lahore. 136 pp. Price Re. 1-12.

THIS is a useful little handbook which should be very popular among students and Indian practitioners. The author is in charge of the Ear, Nose and Throat, outpatient department of the Mayo Hospital, Lahore, and he has here collected together his clinical lectures to students, together with the points of clinical importance in ear, nose and throat work. The book puts together in a brief and collected form easy and every day methods of examination, and the causes and diagnosis of the commoner diseases of the ear, nose and throat. The author makes no claim to originality in the book, but he has done his work well, and the student or general practitioner who cannot afford the more expensive type of book dealing with this branch of work, will find in this little book sound and straightforward instructions. The book is one of the best of this class of small handbooks for Indian students, published in India, that we have seen.

A SYSTEM OF RADIOGRAPHY: WITH AN ATLAS OF THE NORMAL. BY W. IRONSIDE BRUCE: 2ND EDITION.—Edited By J. Magnus Redding, F.R.C.S. (Eng.), L.R.C.P. London: H. K. Lewis & Co., Ltd., 1924. Pp. xii & 98. Price 30s. net. Illustrations 197.

THE original edition of this work was written with the intention of standardising radiographic technique and thus facilitating the comparison of normal with abnormal appearances in skiagrams.

It would be superfluous to dilate on the success of Dr. Bruce's endeavours in this direction, suffice it to say that no work on radiography has been more widely consulted.

Owing to the rapid advance of radiography and the general improvement in apparatus, a second edition was long overdue. But the possibility of its production was precluded by circumstances due to the great war and to Dr. Bruce's illness and untimely death.

The present edition is edited under the direction of Dr. J. Magnus Redding. The illustrations have been entirely renewed, while the general scheme and arrangement of the book remain unchanged. Radiograms taken from above or below the couch, with equal facility as regards standardisation, are produced. The general standard of the radiograms is excellent, though some of the more difficult subjects seem to have suffered in reproduction.

Skiagrams of subjects aged 10 years have been substituted for those of 15 years in the former edition. Developmental variations and abnormalities have been noted below each radiogram, a plan which deserves special commendation.

Owing to the plan of placing more than one illustration on each page, 88 additional figures have been added without increasing the size of the book.

The work is now thoroughly up to date and as a standard work of reference as well as a guide to the radiographer. It should be in the hands of every radiologist and surgeon.

J. A. S.

RADIOGRAPHY AND RADIO-THERAPEUTICS. PART I. RADIOGRAPHY.—By Robert Knox, M.D., Fourth Edition. Illustrated, London: A. & C. Black, Ltd., 1923. Price 40s. net. Pp. 448.

THIS book, which has been described as the standard work on radiology in the English language, has deservedly reached its fourth edition. It contains much new matter, particularly with reference to the radiography of the liver, gall-bladder and urinary tract, also fifteen additional plates.

It would be superfluous to dilate on the merits of this admirable treatise; suffice it to say that it contains within its covers a full and practical consideration of x-rays, radiography, radium and radio-therapeutics, and serves as a work of reference alike for the radiologist, physician and student.

The skiagrams with which it is illustrated are of the first order, so much so that one American authority describes it as a veritable atlas of roentgenology.

The author states in his preface to the present edition that in view of the more elaborate volumes dealing with the chest, and the gastro-intestinal tract which he has in preparation, it has been decided to leave these sections practically as in the previous edition. We hope that this defect will soon be remedied. As it stands, this work is regarded as the standard English work on radiography and radio-therapeutics, and it is a pity that any section should be inadequately dealt with.

We congratulate Dr. Knox on the further perfection of his great achievement.

J. A. S.

PRACTICAL CHEMICAL ANALYSIS OF BLOOD.—By Victor Caryl Myers, M.A., Ph.D. 2nd edition. St. Louis: C. V. Mosby Co., 1924. Pp. 232. Price \$4.50.

THE author is to be congratulated on the publication of this excellent volume containing the latest practical methods of bio-chemical analysis. It is encouraging to note that the study of micro-estimation of blood constituents which is of recent date only is making quite rapid progress, especially in America, where the book under review forms one of the standard works on the subject. The arrangement of the matter dealt with in the book is all that could be desired and in describing methods for practical analyses the author has given a wide choice.

We have no hesitation to say that the book is one of the most up to date works on the subject and we strongly recommend it to those who are interested in the practical study of bio-chemistry.

J. P. B.

THE LEUCOCYTE IN HEALTH AND DISEASE.—By C. J. Bond, C.M.F., F.R.C.S., pp. VIII + 84; Illustrations, 48 in 24 plates, 1924. London: H. K. Lewis and Co., Ltd. Price 12s. 6d. net.

THIS book is a record of the results of many years of close and intensive study of the biochemistry and physiology of the leucocytes of the body, chiefly of the polymorphonuclear leucocytes; and its author is to be congratulated on the unbiassed method in which he puts forward his conclusions, and also on the series of magnificent microphotographs incorporated in the volume. Here—incidentally—he makes use of a new method of studying the vital processes of the cell,—by viewing it under dark ground illumination.

The body is tremendously dependent upon its leucocytes for its protection against disease. Not long ago two

rival factions held the field; the one, the school of Metchnikoff, holding that the chief mechanism of immunity rested in the phagocytic activity of the leucocytes; the other, the school of Ehrlich, holding that the immunity principle depended largely upon the formation of antibodies in the plasma. The ordinary teaching in pathology to-day is that the truth is that immunity depends upon a combination of both factors, the cellulo-humoral theory. And upon this basis has been built up an enormous, almost top-heavy, superstructure, with an almost incredible nomenclature of complement and amboceptor, of opsonins and aggressins, of end pieces and tail pieces, until to-day, the literature on immunity is almost too complex for the study of a single individual. And many investigators feel that we have lost sight of the wood among the trees: that what is wanted is a further collection of *facts* rather than the enunciation of further theories. And as a record of such a collection of facts and a fine example of the value of combining biochemical and microscopical methods, we would especially welcome Mr. Bond's book. It carries us into the realm of newly ascertained facts, but its author studiously refrains from speculations.

Briefly, we may try to sum up his findings as follows:

(1) The form and outline assumed by living leucocytes have very important bearings on their activities. Thus stimulated leucocytes—such as those emerging from a blood clot—in addition to forming the usual pseudopodial processes, protrude very fine and delicate fibrillar dendrites, by which they can adapt themselves to the finest surface irregularities of any substance or object with which they come in contact. (2) Secondly such stimulated leucocytes, also living pus cells, as any observer who has done much dark ground work will at once confirm, frequently shew an oscillatory movement of the cell granules, an indication of the chemical activity going on within the cell. (3) Further the lobes of the polymorphonuclear leucocyte frequently change in relative position to one another,—and a single lobe may travel along an extending fibre and become detached from the rest of the nucleus. (4) Thus in general the mechanism of phagocytosis is seen to be one of close physical adaptation to surfaces and of great chemical activity within the cell. (5) The liquor puris, like the blood serum, is inhibitory or poisonous to the living pus cells in proportion as it contains the products of cell disintegration or bacterial toxins. Washed pus cells, like emigrated leucocytes, can phagocytose foreign or toxic red cells without any previous preparation of such cells for digestion by the liquor puris. (6) In different diseases, the emigrating property of living pus cells varies very much; thus in malaria it is feeble, in acute pneumonia it is very marked. (7) The attitude of leucocytes towards their prey,—(such as the red corpuscles here used throughout for the experimental tests)—depends upon some reaction between the red cells and the serum, whereby additive toxic or opsonic substances are formed on the surface of the red cells by the serum. (8) In cyanosis from prolonged ether anaesthesia, for instance, the leucocytes shew an increased aggressiveness towards the red cells. (9) In the presence of insulin, the diffusion substance elaborated by the leucocytes is increased, and this may have an important bearing on the mechanism of carbohydrate metabolism by leucocytes. (10) The first stage in phagocytosis of red cells by leucocytes is that the latter secrete a substance, an erythro-leuco-agglutin,—which secures mutual *adhesion* between the phagocyte and the red cell. This is followed by ingestion, and then digestion of the red cell. (11) A benzine-iodine test introduced by the author, shews that stimulated leucocytes secrete a "diffusion substance," which is not merely one of the ordinary oxydase ferments present in many living cells, but which appears to be related to the "idophilic substance" generally recognised to be present in living pus cells. This diffusion substance is exuded into the environment and prepares the prey for agglutination and ingestion. The same substance is also present in some normal epithelial cells, in some

cancer cells of epithelial origin, in the multinucleate giant cells of myelomata, and in certain marrow cells. (12) The erythro-opsonic capacity of a blood serum, under certain conditions is not removed, but is increased, by heating the serum to 56° to 60°C., the active principle is thus thermostable. (13) The evidence suggests that the erythro-opsonins and the erythro-toxins present in certain diseases are intimately associated; the former may, indeed, be derived from the latter. Finally, (14) substances can be extracted by an acetone process from the envelope of washed red cells, which, when again brought into solution, will sensitise red cells for ingestion by the leucocytes.

It will be seen that Mr. Bond's book is a most careful, lucid and interesting contribution to the literature. Teachers of pathology may possibly try to fit in his findings into the jig-saw puzzle of the present views and nomenclature with regard to immunity. We much prefer his own method of collecting new facts and leaving deductions to the future. The author's volume is one which is not easy reading, but which should be carefully studied by every thoughtful pathologist and research worker in the difficult subject of immunity.

R. K.

THE EXTRA PHARMACOPŒIA OF MARTINDALE AND WESTCOTT. Vol I, 18th edition. London: H. K. Lewis & Co., Ltd., 1924. Pp. xxxviii plus 1,163. Price 27s. 6d. net.

THE last edition of this remarkable book appeared in 1920. Since that date there have been many important advances in treatment nearly all of which are fully dealt with. The book is much more than an exhaustive compilation of all the most important recent work on drugs and their uses in treatment; throughout its pages there will be found the critical judgment of its expert authors on the methods which are advocated by a multitude of workers.

The great success of the book forms the best testimony to its value to the practitioner, every three or four years a large new edition is called for. It is quite impossible to review in any detail the contents of the 1,200 closely printed pages of the handy little volume. A very valuable feature of the book is that the newest and most fashionable drugs are discussed in a coldly critical manner, so that the doctor who forms his opinions from Martindale and Westcott is unlikely to be carried away by enthusiasm and afterwards to experience disillusionment. The cocaine substitutes, for example, are not vaunted as epoch-making advances, they are shown in their true light.

The over-praised emetine bismuth iodide is summarily dealt with as being too objectionable to patients for ordinary use: emetine periodide appears to be better in all respects, but most workers on tropical diseases are coming back to the moderate use of emetine which has the great advantage of doing all that is claimed for it, though it does not often succeed in sterilizing the chronic carrier of the entamoeba of dysentery.

The derivatives of chaumoogra oil are impassionately discussed, the efficacy of those in common use appears to be undoubted, but one great boon which has resulted from the work of Rogers and others is that leprosy has been withdrawn from the list of diseases which were regarded as incurable. Exaggerated claims for the new treatment are to be deprecated, but an attitude of scepticism and pessimism will do even greater harm than undue enthusiasm.

In dealing with the derivatives of cinchona bark the authors bring the subject well up to date, the use of quinidine sulphate in auricular fibrillation is fully dealt with. Great stress is laid on the failure of quinine as a prophylactic in Macedonia during the war. From experience in India the reviewer would emphasize the importance of rejecting evidence as to the failure of quinine, unless the most rigorous precautions have been

taken to ensure the administration of the drug in the doses ordered and in absorbable form. Too many medical men regard the writing of a prescription as being the same thing as the actual taking of the drug. The experience of all workers who supervise their dispensaries is that when really administered quinine is one of the most trustworthy drugs in existence.

The account of the antimony preparations which have been used in kala-azar is rather disappointing, some of the most valuable drugs are not even mentioned.

The Extra Pharmacopœia is the daily companion and guide of thousands of medical men, no doctor who has had experience of the book would willingly dispense with its aid.

A MANUAL OF SURGERY (ROSE AND CARLESS).—

By A. Carless, C.B.E., M.B., M.S. (Lond.), F.R.C.S.; assisted by C. P. G. Wakeley, F.R.C.S. London: Baillière, Tindall & Cox. Eleventh edition, 1924. Demy 8vo. 1,600 pp.; 17 colour plates, 634 text illustrations, and a special X-ray supplement. Price 30s. net.

"ROSE AND CARLESS" has been the friend and counsellor of many generations of medical students and practitioners since its first appearance in 1898; its reputation is world-wide; in fact it may be said to be the leading standard text-book on surgery in the British schools. The new, eleventh edition is an advance even upon its previous excellence, and incorporates the experience gained during the war; indeed a special chapter on military surgery at the end of the volume will be found very useful by all military medical officers. In this edition the section on pathology has been revised by Dr. Cecil Bosanquet; that on diseases of the nose, ear and throat by Mr. C. W. M. Hope, F.R.C.S., surgeon to the Throat Department, King's College Hospital; and that on anaesthesia by Dr. Playfair, anaesthetist to the same hospital. The colour plates are literally perfect, and exceedingly instructive; that on strangulated hernia for instance will teach the student far more than any text.

For sound instructive teaching in surgery "Rose and Carless" is unrivalled and the volume is wonderful value for its price, both to the medical student and general practitioner. It is pleasant to be able to welcome a new edition, even better than its predecessors.

LEPROSY: DIAGNOSIS, TREATMENT AND PREVENTION.—By Dr. E. Muir, Research Worker under the Indian Research Fund Association, Calcutta School of Tropical Medicine, Cuttack: Orissa Mission Press, 1924. Pp. 29, illustrations 11, paper covers. Price 4 annas.

IN producing this little pamphlet, Dr. Muir has rendered a real service of value to the medical profession in India, since the lessons herein expounded are so important, the medical practitioner's knowledge of the disease usually so limited and inaccurate, and the price of the pamphlet so very cheap that it is within the reach of all patient and physician alike. The consecutive chapters deal with the importance of early diagnosis, methods of diagnosis—clinical and bacteriological,—subsidiary signs, differential diagnosis, predisposing causes, and the stages of the disease. Treatment is next considered, with a full description of the preparation and modes of use of the ethyl esters, counter-irritation, prognosis and useful rules for those under treatment. Finally comes a section on prevention, the factors determining transmission and precautions needed to be taken by the public, by lepers, and by their medical attendants. We may add that there are 11 good illustrations.

There is packed into this little brochure a wealth of expert and accumulated information which is nowhere else accessible. We trust that this pamphlet is but the prelude to a work of much larger proportions; in the

meantime we would particularly welcome it, and bring it to the notice of the general practitioner in India.

A MANUAL OF PLURIGLANDULAR THERAPY.—By H. R. Harrower, M.D. London: Endocrines, Ltd., 1924. Pp. 288.

THIS small brochure is published by Endocrines, Ltd., as a digest of previous publications, and covers the whole field of pluriglandular therapy. Whilst there is much in it which can hardly be considered to be as yet confirmed, yet the style is clear and readable, and the indications for such therapy under different conditions are well set out. The book will be found very useful by the general practitioner, not only as an introduction to the subject, but also for reference. We are asked to state that a few copies are available gratis from Messrs. Thacker, Spink & Co., P. O. Box 54, Calcutta, for distribution to applicants, on receipt of 8 annas to cover postage.

SMITH'S MEDICAL VISITING LIST FOR 1925.—London: Hazell, Watson & Viney, Ltd. Size $6\frac{1}{2} \times 3\frac{1}{2}$ ". Prices; in cloth for 25 to 100 patients, from 6s. to 10s.; leather with tuck-in flap, from 9s. to 12s.

THIS very attractive little book is exactly the thing for the general practitioner to have on his office table, and to carry with him on his rounds. It contains a miscellany of useful information, including medico-legal information and a prescriber's compendium. The actual visiting list itself contains ruled pages for keeping a record of visits, obstetric and vaccination engagements, patients' and nurses' addresses. Two excellent ideas are special pages for drugs and instruments wanted, and, for a list of things lent. The practitioner who buys this little book will certainly find it very useful to him in practice.

TREATMENT OF KALA-AZAR (IN BENGALI).—By Dr. Arun Kumar Mukhorji, M.B. (Cal.). Published by S. C. Bhattacharyya, 23-B, Bothuno Row, Calcutta. Price Re. 1-8.

THE first two chapters contain a brief account of the geographical distribution and history of the discovery of the parasite of kala-azar and in the following chapters symptoms, diagnosis, specific treatment and treatment of the complications of the disease are dealt with in a clear style. This little book will be a very useful guide in the treatment of kala-azar for many practitioners in Bengal and Assam.

THE FIRST LAWS OF HEALTH. A HEALTH READER FOR INDIAN SCHOOLS.—By Lt.-Col. J. W. D. Megaw, B.A., M.B., I.M.S., Director, Calcutta School of Tropical Medicine. With a foreword by Sir Leonard Rogers, K.C.I.E., F.R.S., F.R.C.P., Lt.-Col., I.M.S. (ret'd.). Humphrey Milford. Oxford University Press. London, Bombay, Calcutta, Madras, 1921. Pp. 91. Available in English, Urdu, Hindi and Singalese.

THE object of this excellent little manual is to set forth in clear and simple language the primary laws of Nature which are essential for healthy living and also the well established facts of sanitary science and ordinary diseases, a knowledge of which will aid all classes in preserving their bodily and mental health and in avoiding the common preventable infectious diseases which carry off so many lives in India. The names of the authors of the manual and of the foreword are a guarantee of the accuracy of the information imparted. As Sir Leonard Rogers states in his foreword, to impart such information successfully is no easy matter, but demands in addition to knowledge literary skill, and

an intimate acquaintance with the habits and customs of the people. Lieutenant-Colonel Megaw possesses these attainments and has used them with happy success in writing this primer for use in Indian schools. Not only children, but youths and grown up men and women, will benefit by the knowledge and advice imparted and we would wish to see a copy in every Indian household. The book is of a handy size, the printing excellent and the illustrations are numerous, apt and well reproduced.

A. D. S.

GUIDE TO THE INSTRUMENTS AND APPLIANCES REQUIRED FOR OPERATIONS AND THE DRESSING OF CASES.—By Lt.-Col. R. H. Castor, I.M.S. Second edition, 1924, revised by Lt.-Col. F. P. Connor, D.S.O., F.R.C.S. (Eng.), I.M.S. Paper covers; 34 pp. Calcutta: Messrs. Thacker, Spink & Co. Price Re. 1.

THIS little book will be found very useful by civil surgeons, hospital residents, and nurses. The author makes no claim to originality for the work, but it is just the sort of one for a busy civil surgeon to place in the hands of his assistant, or for a theatre sister. The chapters deal with rules for and the fitting up of the operation room, the names of instruments, anaesthetics, and lists of instruments which are required for different operations in ophthalmological, dental, aural, gynaecological and obstetric work, a useful glossary of surgical terms used for different operative procedures, and an index. The printing and general get-up of the book are distinctly good.

Annual Reports.

REPORT ON THE PRISON ADMINISTRATION OF BURMA, 1923. RANGOON; SUPERINTENDENT GOVT. PRINTING, BURMA, 1924. PRICE RS. 4.

WE regret very much to read in this report, which is by Lieutenant-Colonel H. H. G. Knapp, M.A., M.D., I.M.S., Inspector-General of Prisons, Burma, that it is the last which he will write, and to learn of his pending retirement, for Colonel Knapp's reports are not mere compilations of statistics, but human studies of the very difficult problems of prison life and penology in India. Thus, when he comes to sum up the immediate needs of the present day position, he advocates (a) a separate staff of matrons and wardresses for female prisoners; in fact, if possible, a separate female jail with a staff of women subordinates; (b) a special new jail for juvenile-adult prisoners up to the age of 21, to be run on "Borstal" lines; (c) the need for the improvement of the subordinate staff of warders, both in numbers and character; for, in spite of increased pay and concessions, deterioration rather than improvement is here recorded. The report of the Burma Retrenchment Committee acknowledges that the prisons in Burma are run on very economical lines, but, as matters at present stand in Burma (and India) jail life is no deterrent to the habitual criminal. "The present staff of the Moulmein Jail cost Rs. 24,349 in 1923 and I reckon that the proposed improved staff would cost about five times as much. Efficiency has to be paid for; you cannot buy a Rolls-Royce for the price of a Ford."

But in reality what is wrong in the Indian prison system is not merely the parsimony which adverse financial conditions impose upon it, but the uncertainty of punishment. "All the evidence goes to show that severity of punishments does not deter, but that certainty of punishment does. Years ago in England punishment was barbarous and uncertain, and crime was rife. To-day punishment is comparatively light, but

pretty certain." Further the Indian and Burmese public lack the education with regard to crime which is so marked a feature of the every day English citizen; in England a criminal is the enemy of the public, in India the public do not regard him as such. There is far too little control of children and young men by parental care and discipline. The criminal whose crime stands a very considerable chance of never being punished at all, tends to repeat it. Prison life, when once experienced, turns out not to be the torture which he had anticipated; in the absence of special provision, the first offender is housed together with the habitual and the recidivist, and by them taught crime as a systematic career. Finally, Colonel Knapp pleads for "the exploration of all known means whereby offenders can be dealt with otherwise than by incarceration," and holds up the American system of "probation" as worth following. A fact which should appeal to legislators in this connection is that in America the cost of the prisoner on probation is about one-twentieth of that of a prisoner in jail.

Every jail superintendent in India—and this includes most civil surgeons—knows of the reality and importance of the issues which Colonel Knapp here raises. But whether Indian legislators have ever even thought about them at all, we do not know.

Turning to the main body of the report, there were 7 central and 23 district jails open during the year, together with 4 subsidiary jails which are under the control of the Police Department. The central jail at Tharrawaddy, which is now in process of construction, is to house 1,500 prisoners, and the project for another at Pegu has been held in abeyance until it is seen whether the new accommodation at Tharrawaddy and elsewhere will be sufficient for all purposes or not. Examination of the Shan and other hillmen prisoners in the Myingyan Central Jail shews that these hillmen are unduly unhealthy and cannot stand the climate of the plains. "There ought to be a jail at Taunggyi or elsewhere for Shans and other hillmen, but I fear that this must wait till the Shans themselves decide to build one." The proposed leper jail near the two leper asylums at Rangoon has been abandoned, as the proposed site was found to be malarious. The proposal for building two jails near Rangoon, one for under-trial cases, short term convicts and civil debtors, and the other for long term prisoners has been abandoned. In its place improvements are to be made in the existing Rangoon Jail.

The daily average prisoner population for the year was 16,287 as against 16,607 in 1922. 81 per cent. of the prisoners are Buddhists, and the most meticulous care is taken to provide full religious facilities for all castes and creeds of prisoners. There was a satisfactory diminution in the number of juvenile prisoners admitted, 90 as against 124 in 1922, and it appears that magistrates in general are beginning to realise that to send a juvenile first offender to jail is to incur the risk of "creating rather than of curing crime." Literacy is extraordinarily high, 69 per cent. of prisoners being recorded as able to read and write, but Colonel Knapp considers that this figure is probably above the mark. The Burma Suppression of Brothels Act, 1921, accounted for the admission of an unusually large number of prostitutes to jail during the year. Habitual prisoners numbered 29.4 per cent. of the total number of 18,579 admissions during the year; and it is clear that some 30 per cent. of the jail population is present throughout most of the jails of India and Burma as an educational influence for evil upon the other 70 per cent. of those admitted for the first time. The two classes should, of course, be segregated from one another; were 30 per cent. of the jail population diphtheria carriers instead, probably the money for this reform would be found at once.

There was a slight all-round increase in the number of offences and punishments dealt out, as compared with the figures for 1922. Colonel Beit reported that at Moulmein the experimental issue of tobacco as a reward for good conduct had proved a failure; also the issue of

soap had to be stopped, as it was found that the soap was being used as a currency and for the hiding of forbidden articles. On the other hand, Major Flowerdew at Insein reports that the issue of tobacco after the day's work has materially improved discipline in the jail; it is allowed only to those who have been for three months clear of punishment.

Serious offences are relatively few. At Rangoon a warder reported a prisoner for loafing, and the latter threw a brick at him, causing fatal compression of the brain. At the same jail and at Bhamo there were isolated assaults on warders. The percentage of floggings is very low, only 0.23 per cent. of male convicts (women prisoners, of course, are never flogged); but it has now been ruled that the offences for which whipping may be administered shall be severely restricted, a state of affairs which will make prison administration more difficult still.

Insein and Myaungmya Central Jails are reserved for habitual prisoners. Here the rules of the game are well understood both by prisoners and warders, and the habitual prisoner is usually an exemplary one, in the hopes of earning remissions of sentence. It is hoped to soon make the jail at Thayetmyo also one for habitual prisoners only. One reform advocated by the Indian Jails Committee has been introduced during the year; convict night watchmen are now selected only from habitual prisoners, and do not include any of the casual class. This has resulted in improved discipline, and Capt. Smith, writing from Mandalay, dwells upon the value in Indian Jail administration of the convict warder. He is often a better warder than is the paid professional one, and the jails of India simply could not be carried on without placing such selected prisoners on warder duty.

Owing to representations made, the duration of time during which under-trial persons have been incarcerated pending decision of the case has been materially improved, a most welcome fact.

Financially the total expenditure of the year on the Department was Rs. 19,74,903, an increase of Rs. 88,502 on the figures for 1922. The increase is chiefly due to the entertainment of 142 additional warders during the year, the grant of house allowance to subordinate staff, and payments of increments earned by the jailor and warder staff as a whole. The jail dairies and gardens shewed a substantial profit, in addition to providing for the requirements of the jails themselves. Earnings by jail labour amounted to Rs. 2,38,167; the average earnings per prisoner being Rs. 17-15-10, and the average cost Rs. 106-10-0 per annum.

Turning to vital statistics, the dietaries were sufficient, and only 15 per cent. of prisoners lost weight after admission. Water supplies are being improved, and an electrolytic chlorine plant is being erected at the General Hospital, Rangoon, which may serve the jail and other local institutions also. During the year 118 prisoners were employed on microscopical examinations for hook-worm ova, of whom 28 were efficient. Lack of funds is interfering with the issue of two sets of clothing and of towels to all prisoners, but the best is being done with the funds available. The dry earth conservancy method is followed in most of the jails, but at Rangoon incinerators are used. The daily sick numbered only 24 per mille and deaths only 12.53 per mille. "No people get closer medical attendance than those who are the least meritorious of the community" writes Colonel Knapp, "and their healthiness bears witness to the efficacy of medicine, especially on its preventive side."

Cholera was practically absent,—one death only and in this the diagnosis was doubtful. Malaria chiefly affects Kyaukpyn jail. A test at the special tuberculosis jail at Myingyan shewed only 16 per cent. of negative findings to von Pirquet's test. Sodium morrhuate was not altogether promising, but Colonel Jeudwine's method of intravenous injections of iodine in relatively large doses was tried, and the results warrant further test. The enteric fevers shewed a decrease, probably due to

universal vaccination against these diseases. A special campaign was conducted against hookworm disease, and all prisoners were examined and those found to be infected were treated, this accounting for 7,910 admissions to hospital as against 798 for the same complaint in 1922. Infection rates varied from over 80 per cent. at Rangoon and Insein to 10 per cent. and under at Shwebo, Magwe and other small jails.

The juvenile jail at Meiktila continues to do good work. Major Fielding at Rangoon writes with regret of the abolition of simple whipping as a punishment for lesser offences. Thus the Deputy Commissioner of Tharrawaddy says that he would like to punish youths guilty of such offences as travelling on the railway without tickets by simple whipping, but as the law stands, he is powerless to do so, and they are accordingly sent into the jail to mingle with habitual criminals. An English public schoolboy is often whipped for far more venial offences, indeed very few public schoolboys in England can have gone through their school days without some experiences or other of the kind, and the apparently more lenient sentence of imprisonment is fraught with far greater risks and dangers to the youth's future.

The number of visits by official visitors was only 255 as against 316 in 1922. Certain officers are singled out as having done excellent work during the year; especially Majors Tarapore, Fielding and Flowerdew and Captain Smith. Mr. Hitecock of the Inspector-General's office staff retired during the year, after 35 years of most intelligent and valuable work.

REPORT ON THE JAIL ADMINISTRATION OF ASSAM FOR THE YEAR 1923, BY COLONEL C. H. BENSLEY, I.M.S., INSPECTOR-GENERAL OF PRISONS, ASSAM. SHILLONG: ASSAM SECRETARIAT PRINTING OFFICE. PRICE, RE. 1.

It is curious how alike are many annual reports by Inspectors-General of Prisons in different provinces of India. Their difficulties are similar; the want of funds for very urgently needed improvements is common to all; and the very difficult problems of the control of crime in India appeal to all of them alike and from an entirely different point of view from that of the courts. If we compare the report for Burma for 1923 with that for Assam for the same year, the general sections of either are very similar.

Thus Colonel Bensley complains of the mixing of the young first offender with the habitual criminal; such a procedure does not prove a deterrent to crime; rather it creates the criminal in place of reforming him. "It is taking upon one's shoulders an enormous responsibility to send one of these youths to jail where the very air which he will breathe is contaminated with the germs of evil. I consider that there can be little or no excuse for sending such an offender to jail for short periods. What we require is a special institution of our own for dealing with those cases which sentencing courts find it impossible to deal with otherwise than by imprisonment."

Secondly, comes the evil of short term sentences. "It is satisfactory to note that there has been a decline in the number of sentences not exceeding three months; but all the same as many as 584 persons received sentences not exceeding one month and 1,029 sentences exceeding one month but not exceeding three. The passing of these short sentences is very undesirable; they are not deterrent, nor can they be made reformatory even under the best of jail conditions. We do not want to familiarise these first offenders with the inside of our jails. I fear that the importance of separating habituels from casuals has been overlooked in this province. I do not think that there has ever been realised the amount of evil contamination the habitual prisoner is capable of, and first offenders, guilty of only

petty crimes, should be kept out of our jails by all means possible, and when it is necessary to send a first offender to jail, it should be for such a length of sentence as will be deterrent in nature and which will enable us to do something towards reforming him whilst he is in jail. Our jails are simply turning out criminals, and this, I am convinced, is mainly due to the fact that so little attention has been paid to the separation of habituels and casuals in our jails. I have been able to effect some improvements. But, limited as they are by financial stringency and based on faulty jail construction, they cannot pretend in any way to perfection. However, something has been done."

Then follows a short and most instructive essay on the objects of imprisonment, and what we should aim at during the offender's imprisonment in the way of discipline and reformation of character. Even the Indian criminal, if caught young, is amenable and susceptible to moral influence; his mentality is still almost childish; but "evil communications corrupt good manners" and too often jail is an educational influence for evil. Special jails for youthful offenders, run upon the Borstal system, are badly wanted in India; but—as usual—there are no funds available, and an Indian Howard is still to seek. Also the probation and ticket-of-leave system, and advisory committees of non-officials to help ticket-of-leave men and prisoners on probation to get work, are badly wanted. Here there are unbounded opportunities for philanthropic bodies, but as it is, there is a good deal of lukewarmness even about official and non-official visitors to jails. The Discharged Prisoners' Aid Societies are very helpful, but they simply do not exist in Assam. Legislative assemblies are incessantly enquiring about prison administration; the questions asked are legion; but who of the many enquirers has ever studied the very difficult problems of penology with special reference to Indian conditions? America is trying to deal with the youthful offender by a system of liberty on probation; Great Britain has its ticket-of-leave system for habitual offenders; but in India we send both first offenders and hardened habitual criminals to jail together for short or long periods, therein to mingle, so that evil may corrupt what is still impressionable and still not essentially evil in character.

With regard to all possible measures of segregation, the jails of Assam are hopeless. There were 13 escapes from jail during the year. 9 from outside and 4 from inside the jails, and all of them due to negligence. "Nearly all our jails are insecure owing to defects in construction; many of them are surrounded with bamboo palisades only, and in the case of those with brick walls, the walls are too low. There is no use suggesting remedies when funds are not to be had; the strength of the warder guard is far too low," and morale has in general deteriorated of recent years. But increased pay and a better class of warder are not to be had; "We must do the best with what material we can obtain." (Some day soon the crying evil of the inadequate pay, chronic overwork and miserable conditions of life of the warders in the Indian jails will reach a head, to judge at least from report after report which we have been called upon to review of recent years. The right type of man is the pensioned non-commissioned officer from an Indian regiment; but the conditions of service offered, although recently improved in some provinces, are hopeless. These men are badly housed,—often worse housed than are the prisoners; they are chronically overworked, in fact a whole night's rest in bed is the exception amongst them owing to shortage of cadre and sickness; often they are compelled to serve in most unhealthy areas. The recent Indian Jails' Commission made recommendations; but, as usual, the reply is that funds cannot be found.)

To some extent, the difficulty can be overcome by the selection of suitable convict warders and night-watchmen. This scheme, which has surely been in vogue in other provinces for some years, was introduced in Assam during 1923 and has worked well. The right type of

man to select is, in reality, the hardened habitual criminal himself. He is an exemplary prisoner whilst in jail, as a rule, and a strict disciplinarian. On condition that his efficiency earns remission of sentence, he does his work well; in fact in Burma, some Superintendents say that they prefer him to the paid professional warder!

Lastly, Colonel Bensley has a few remarks to make, and these much to the point, with reference to the necessity for jail officials to realise the tremendous influence which their own character and conduct may have over their prisoners. A high standard of personal living, strict discipline, and an absolutely just standard; these are what impress and teach the prisoner more than anything else, "I know the difficulties; I know the feelings of the harassed jail official on a typical hot weather day, when he has been up since 5 a.m. and closes his jail at 6-30 p.m., and then does not know what may happen in the night. I know the worries he experiences, the pinpricks from the hardened habitual, the hundred and one demands he has to meet. An atmosphere of this kind does not encourage sympathy. I am afraid the whole case once more revolves around that vicious circle of financial stringency, but it is nevertheless the fact that economy in the administration of the jail department brings about innumerable hardships and misfortunes to all concerned, be they officials or prisoners." Will honourable members of Legislative Councils in a hurry to cut down all grants for prisons, please note? We fear not; they do not understand the first elements of the problems which they so light-heartedly tackle.

Turning to the statistical side of the report, the year shewed a definite decrease in the prison population, the year opening with 2,615 prisoners of all classes under confinement and closing with 2,424 prisoners in jail. The daily average of prisoners of all classes was 2,519 as against a figure of 396 more in 1922. Muhamadans numbered 41 per cent. and Hindus and Sikhs 52 per cent. In 1922, 0.21 per cent. of prisoners were under 16 years of age, in 1923 only 0.11 per cent., a welcome improvement. 74 per cent. of prisoners admitted belonged to the agricultural class. No less than 97 per cent. of prisoners admitted during the year were illiterate. There was a slight increase in the number of women sent to jail, and here conditions are wholly unsatisfactory, as frequently only a bamboo palisade intervenes between the male and female sides of the jails. 16 per cent. of the sentences given were for periods not exceeding one month, 44 per cent. for periods not exceeding three months, and 68 per cent. for periods not exceeding six months. (This approximately means that some 9 per cent. of prisoners admitted were habituals, who were present to contaminate the large volume of new first offenders and youthful offenders.) Owing to the return of prisoners from the Andamans, plans were proposed for the building of a new up-to-date jail at Jorhat, but financial considerations of course prohibited this. The number of persons detained under-trial underwent a substantial improvement, 4,709 as against 5,799 in 1922, a matter for congratulation in view of the interminable lengthiness of procedure in the Indian courts. "Civil," i.e., political prisoners, numbered only 2 at the beginning of the year and 1 at the close of it,—a striking change from the figures for recent years;—apparently the finances of the extreme Swaraj movement require replenishing.

The number of offences by prisoners dropped from 3,035 in 1922 to 2,690 in 1923. Major punishments—chiefly handcuffing—have perhaps been resorted to rather too much during the year under report, but the infliction of penal diets has been reduced. Only 6 prisoners were flogged during the year, or 0.08 per cent. of prisoners present, an incidence some 30 per cent. below that for any English public school. The number of prisoners who earned remission of sentence shewed a marked improvement upon the figures for 1922.

The conditions of the warder staff are deplorable. In the first place they are often badly treated by the subordinate jail officials; "they have been given a bad name and there is an end of them as far as jailors and assistant jailors are concerned." Their training has been woefully neglected; many are unable to turn out for inspections; in some jails only a small proportion have been partially trained for inspection, the rest being left untrained.

Vital statistics for the year reveal an unlucky one. The death rate, 23.82 per mille, was higher than that for the jails of any other province in India. But 43 per cent. of prisoners were admitted during the year in indifferent health, and 15 per cent. in bad health; figures considerably above the corresponding 42 and 12 per cent. for 1922. There was also a striking increase in the number of confirmed drug-takers admitted, no less than 29 per cent. of those admitted from the Assam Valley being habitues to opium, ganja, etc. On the other hand admissions to hospital shewed a decided drop, and the year was as a whole healthy. Deaths from among prisoners admitted with such hopeless conditions as advanced Bright's disease, chronic dysentery, gastric ulcer, advanced phthisis, Banti's disease, and advanced kala-azar help to swell the total. Sibesar sub-jail had three deaths in the month of December, one from cerebral apoplexy, one from heart disease, and one from chronic sprue, which help to swell the total. Malaria accounted for 594 admissions on an average daily strength of 2,519; dysentery for 132, pulmonary tuberculosis for 20 admissions with 12 deaths, and pneumonia for 37 admissions with 12 deaths. A special tuberculosis ward, if not a special tuberculosis jail, is very badly needed in the province. All jails in the province are now provided with microscopes and there is no excuse for the late diagnosis of phthisis.

The total expenditure during the year upon the department, including the cost of new construction and repairs, amounted to Rs. 3,49,867—a sum nearly half a lakh less than in 1922. The average cost per prisoner, however, was Rs. 138-14-3 as against Rs. 133-14-1 in 1922. The net cash earnings amounted to Rs. 52,619-9-0, however, and the gross profit in the manufacture department to Rs. 75,782. In other words some 20 per cent. of the total cost of jail administration in the province is recouped by its productive activities.

Correspondence.

INTESTINAL STASIS AND CANCER IN INDIANS.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—With regard to your very interesting editorial comments upon my article with the above title in your issue of August, 1924, I feel after re-reading it carefully that I did not differentiate sufficiently between Indians of the cultured and upper classes and the illiterate villager following agricultural or pastoral pursuits.

I have reason to believe that Indians of the former class show little if any immunity from the ills to which the flesh of civilised man is heir.

Only a few days ago I saw a case which illustrates this point.

The patient was a Sikh, a forest officer who up to about two years ago had experienced fair health, though as his medical attendant wrote in his report of the case "constipation had been his life-long companion."

A forest officer spends little of his time in towns or civilised surroundings, the greater part of it is passed in the jungle and in the mountains. He is frequently forced to eat the coarsest of whole-meal atta, and such coarse fruits and vegetables as the local villagers are able to supply.

On the whole the last sort of diet on which to develop chronic constipation, if diet can do anything to arrest its acquisition.

Anxious to investigate this apparent anomaly I asked him to what he attributed his constipation. He replied that it commenced from the time when he first went to a school; he was so anxious to learn that he deliberately inhibited the calls of Nature in order that he might have more time for his studies. In the early morning there was always the rush to get away to school and the moment he had swallowed his food the same hurry to return to his books.

From this habit thus acquired in early life he never afterwards escaped.

When I saw him he was supposed to be dying from an inoperable malignant growth of the bowel, an exploratory operation having taken place some 5 months earlier.

The case is instructive in that it illustrates the fact that of all the factors contributing to produce this state inhibition is the most powerful.

It matters little how well balanced and physiologically perfect a diet may be if the calls of Nature are systematically disregarded, the result will be the same as though white bread and fish and chips were the daily fare.

The unlettered agriculturalist on the other hand has few temptations to neglect the calls of Nature; he has never been exposed to the rush and hurry of town life, never had to submit to the exigencies of school training, never had to wait his turn at the latrine, for, wheresoever he may find himself in field or jungle, his latrine is at hand.

The intention of my article was to approach the subject from the dietetic point of view. I can only speak for the Punjabi whose diet, of course, varies widely from that of the Bengali. I should imagine that the rice-eater would be more prone to suffer from stasis than the whole-meal wheat flour eater, but I have no first-hand evidence on the subject.

As regards the educated Punjabi his diet differs greatly from that of the illiterate villager; the town dweller and the babu class generally are coming more and more to the use of steel rolled Delhi flour and do not eat a great deal of raw fruit and vegetables.

Constipation seems to be very common amongst the clerical and town-dwelling class, but very rare amongst the country people.

Hence in recording cases of acute appendicitis in Indians very definite information is wanted as to diet, occupation, literacy, and previous medical history as regards the existence of constipation or not.

The same applies to the connected diseases such as gall-stones, gastric and duodenal ulcer, visceroptosis, etc.

If it is true, as I believe, that the uneducated villager enjoys an immunity from the group of diseases under discussion, then his habits are as well worth investigation as were those of those Gloucestershire milk-maids whose immunity from small-pox suggested a line of research to Edmund Jenner which led to the discovery of vaccination, the most momentous advance in preventive medicine which had been made up to that date.

I cordially agree that what is wanted are accurate figures, but in all such returns and reports I suggest that dietetic habits, literacy or the reverse, and social position should be clearly indicated.

This is, I fear, a long letter, but the importance of the subject must be my excuse.—Yours, etc.,

H. HALLILAY,
Lieut.-Colonel, I.M.S.

LAMORE,
17th November, 1924.

[Note.—We would welcome a draft of a proposed enquiry circular or card in connection with this subject, asking for all details required, for circulation to all

civil surgeons in India. The information thus collected, when analysed, might prove to be of considerable evidential value.—EDITOR, I.M.G.]

INTRAMUSCULAR QUININE.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—I see that the *Indian Medical Gazette* is once more reviving the stunt of the dangers and inutilty of intramuscular injections of quinine; in fact the crusade is so strenuous that we may soon expect to see the subject filmed, and the sadistic character of the exponents of this method of treatment shown up by lime-light. I am surprised that hitherto no one has had the temerity to break a lance on the subject, and I can only conclude the reason to be that the practice of intramuscular injections appears to be almost universal in malarial countries, but that those who use it have little to reply to theorists but continue to use it, satisfied with their clinical results. I have used intramuscular injections of quinine for nineteen years, being taught how to give them by Dr. Valentine, then medical officer to the North Cachar Tea Estates, and in that time I have given many hundreds, for in my early days I gave them much more freely than I now recognise to be necessary, and in no single case have I experienced any distressing result. Many hundreds also have been given by my subordinate staff, and I have never seen an injection go wrong, save when, against my instructions, it has been given in the arm. There are few operations, or treatments, which cannot be shown on occasion to result in failure or consequential damage, and such will be more frequent if treatment is carried out improperly. An intramuscular injection is a minor operation, and if not done correctly, or sepsis not properly guarded against, naturally, serious consequences may ensue. For instance, the arm should never be used, it appears to possess a peculiar liability to form a sloughing ulcer, and it is difficult to understand why injections are still given in that limb, for as far back as 1912 I was taught in the London School of Tropical Medicine that the practice was dangerous. I have always given injections in the gluteal region, choosing the highest point where the muscle is deep enough to sink the needle in, and the needle must not be the ordinary short hypodermic needle, but long enough to make sure of giving the injection well into the muscle. I have always used Burroughs and Wellcome's hypodermic "tabloids," and an ordinary 20 to 30 minim glass hypodermic syringe. In spite of laboratory experiments some years ago, in which the danger of tetanus and other evils was supposed to be proved, I think there were very few practitioners in Assam who did not continue to use the intramuscular method, being satisfied of its safety and the benefit derived, and that absorption was fairly rapid. I had confirmation of the last point in the case of a patient who, in three to four hours of each ten grain injection, developed a quinine rash. It appears to be generally accepted now that the action of quinine in malaria is not as simple as was at one time supposed, and if certain complex changes must first be effected, perhaps in the muscular tissue, it is open to doubt if intravenous injections have much, or any, advantage in rapidity of action. My impression is that cases receiving no further treatment relapse sooner after intravenous injections.

The ordinary case of malaria is amenable to quinine given in solution by the mouth, and the indiscriminate giving of injections of any kind is to be deprecated. They have their uses, in cases of heavy infection, when it is necessary to quickly control the disease, in cases of vomiting, especially the bilious type, in the case of those not absorbing the quinine, or not taking it as prescribed, and in some chronic cases, in which the extra stimulus appears to be helpful. Intravenous injections ought certainly to be tried in the cerebral form, but does experience show that they are of much avail?

It is probable that there is little to choose between the two methods as regards efficacy. The intramuscular is more painful, but the pain is not great; the patient feels as if he was bruised, but this seldom lasts for more than a couple of days. I have known patients play polo on the next day but one. Intravenous injections have a pull in the matter of pain, but they require more care and skill in their administration, and the risks are undoubtedly greater. It has to be remembered that the treatment of malaria in India is largely carried out by comparatively untrained and unskilled men; it is difficult to realise the ignorance of asepsis that obtains, and I think most of us, in spite of gruesome pictures, would infinitely prefer, if the occasion arose, to be given an intramuscular injection, by such, in preference to an intravenous. A mishap with the latter and one might not live to be photographed!—Yours, etc.,

R. A. MURPHY.

LUSKERPORE TEA ESTATE,
CHANDPORE BAGAN P. O.,
SOUTH SYLHET,
18th October, 1924.

[Note.—We publish Dr. Murphy's letter with much pleasure on the principle of *audi alteram partem*. With regard to the question of tetanus, it does not rest solely on Sir David Semple's work. A very sad tragedy which occurred several years ago in Central India was the death from tetanus of a young English girl, just out from Home, a few days after an intramuscular injection of quinine. The injection had been prepared at a British Station Hospital with every possible precaution taken; but investigations shewed that tetanus spores were present in the distilled water used, and had probably got into it from the straw packing in which the bottles of distilled water had been received by the hospital.

We agree with Dr. Murphy that the arm is an entirely unsuitable site. Not long ago an adult female Anglo-Indian patient was admitted to the Carmichael Hospital for Tropical Diseases in Calcutta. Having gone down with fever she had consulted a practitioner who had given her a course of intramuscular injections of quinine into the deltoids, without apparently even examining the blood. On admission there was a large and foul ulcer in the right arm, at the bottom of which the humerus lay exposed; in the left deltoid an abscess was developing. The case turned out to be one of typhoid fever, and ultimately proved fatal; the fatal issue being almost certainly hastened by—if not due to—the exhaustion of the patient's strength by the prolonged suppuration.—EDITOR, I.M.G.]

THE PSYCHOLOGY OF FREUD.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—I have read with much interest the correspondence appearing in your journal on the psychology of Freud. Lieutenant-Colonel A. W. Overbeck-Wright has a distinguished record in alienist work, and his remarks against the Freudian standpoint certainly deserve a fair consideration. Freud's doctrines have not received universal recognition as yet, and there are bound to be two sides to the question. It is, therefore, easy to quote authorities either favourable or otherwise, according to the leanings of a particular writer.

To condemn a controversial point, something more substantial than the mere quoting of authorities is necessary. One is disappointed to find that Colonel Overbeck-Wright's arguments consist only of vague assertions; "condemned by the majority of British alienists," "discarded by all reputable psychiatrists," etc. The "public denouncement by the British Medical Association" is no better. By the way, one becomes curious to know on what occasion this august body passed such a weighty judgment. Even if the whole world stands

against a doctrine, it does not necessarily prove its fallacy.

One looks in vain for a criticism based on personal experience of the subject in Colonel Overbeck-Wright's letter. Most of the critics denouncing psycho-analysis belong to the armchair type. It is, of course, presumptuous on my part to refer such a distinguished alienist as Colonel Overbeck-Wright to the history of hypnotism with which he is no doubt familiar. Hypnotism was repeatedly condemned by successive scientific commissions in different parts of Europe, and there were many distinguished persons on them. In spite of all hostile criticisms, hypnotism has held its own.

Psycho-analysis has been in the field now for more than a quarter of a century, and there have been adverse critics who have foretold its end before Colonel Overbeck-Wright, but much to the chagrin of all these prophets, psycho-analysis is still going strong. Colonel Overbeck-Wright in the course of his alienist work must have seen persons foretelling the end of the world and daily expecting to see their prophecy fulfilled. The wish in such cases is father to the thought, and although one may sympathise with such a person's mentality, one may as well be excused for refusing to set any value on such assertion.

There is, however, no reason to become impatient of Colonel Overbeck-Wright's attitude. The history of all religious and political movements amply proves that the most violent critic is apt to become the most ardent convert.—Yours, etc.,

G. BOSE, D.Sc., M.B.,
President, Indian Psycho-Analytical Society,
Lecturer in Abnormal Psychology,
University of Calcutta.

14, PARSIBAGAN, CALCUTTA:
26th October, 1924.

"PHENOLAINÉ."

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—With reference to an enquiry regarding 'Phenolaine' in the July number of the *Indian Medical Gazette*, I have to inform you that the drug is a powerful liquid local anæsthetic, and can be employed in operative work of every description.

It can be had from Messrs. W. Martindale, 10, New Cavendish Street, London, W. in 1 dr. and 1 oz. bottles.—Yours, etc.,

VALLABHDAS N. MEHTA, L.M. & S.

VIRAMGAM:
2nd November, 1924.

CHUNAM CANCER.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—In the report on the surgical work at the Government General Hospital, Madras, published in the October issue of your journal, Colonel Bradfield evidently lays much stress on the part played by *chunam* in the causation of cancer of the cheek and lower jaw in South Indians.

The local irritant effects of *chunam* should not make us lose sight of the fact that there is another irritant which contributes an equal share, if not more, to the causation of the said cancers. I refer to tobacco. In the majority of such cases of cancers, on careful enquiry there is invariably a history of the tobacco habit. The tobacco, either alone or more usually with betel leaves smeared with a little *chunam* is taken chewed, and retained between the cheek and the lower jaw. Some people retain this bolus for hours together every day. Thus ample opportunity is offered for the tobacco to work its mischief and exert its irritant action

on the delicate mucous membrane of the cheek and lower jaw for hours together every day. So it is tobacco that comes more in contact with the cheek than the *chunnam*, and the blame should fall more upon the tobacco than on the *chunnam*. Moreover, the *chunnam* does not come into direct contact with the cheek, inasmuch as nobody swallows pure *chunnam* as it is,—much less keeps it in contact with the cheek. *Chunnam* is used by smearing a little quantity of it on the betel leaf or very rarely on the tobacco itself. There is no likelihood of the *chunnam* coming or remaining in direct contact with the cheek for a sufficiently long time. If, as Colonel Bradfield claims, the *chunnam* were entirely to blame, then, considering the fact that almost all Indians chew betel leaves smeared with *chunnam* at least twice a day, the incidence of cancer of the cheek and the lower jaw should be universal or at least very high.

I do not mean to say that *chunnam* does not or cannot cause cancer, nor do I say that all tobacco users get cancer of the cheek. I simply wish to point out that it is tobacco that comes more in contact with the cheek and the lower jaw, and not the *chunnam*, and so the probability of tobacco being the causal agent more than the *chunnam*. As regards the local irritant properties of tobacco, this needs no proof.—Yours, etc.,

G. RAGHUNATHA RAO, L.M.P.

PERAMBALUR, TRICHINOPOLY DISTRICT:

20th October, 1924.

INTRAVENOUS AIR EMBOLISM.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—I have read with interest Dr. Hari Prasad's letter in the October, 1924, issue of the *Gazette* on page 530 regarding *intravenous air embolism*. His letter is both instructive and suggestive, but he has not been able to find a satisfactory explanation of the harmlessness of small volumes of air injected into the vein. This implies a pre-formed idea that the entry of air into a vein is harmful. Now one knows the affinity between venous blood and oxygen, as evidenced in the lungs. Through intervening cells oxygen that is inspired is taken up by the venous blood, which is thus naturally purified. Another example one may cite is that one sees daily on the operation table venous blood spilled, yet if one were to take careful note, it will be seen that gradually the dark-coloured venous blood acquires a bright red colour, and there is no difference at the termination of the operation between the two different "kinds" of blood. In the same way, when air enters a vein, the impure blood readily takes up the oxygen and some benefit is thus derived, but as air also contains gases unsuitable for absorption by the blood in large quantities, besides gross impurities, it would not be safe to employ intravenous air injections as a remedy. But one might in certain cases employ oxygen, slowly from a generator through the graduated container of a Junker's inhaler in order to regulate the supply. And it is with this view I make the suggestion for one, such as Dr. Hari Prasad who has the opportunity to investigate. To my mind only asphyxial cases, such as cases of opium poisoning, colubrine snake poisoning, etc., would be suitable. Oxygen has been successfully employed subcutaneously into the abdomen, and into joints, then why not slowly into the circulation. Hydrogen peroxide 2 ozs. in 8 ozs. saline might also be tried, but here again *very slowly* so as to give the generated oxygen time to be taken up by the blood.

A stream or river during its flow dissolves oxygen from the atmosphere. Is it unreasonable to expect the venous flow to chemically combine with oxygen supplied to it? Experiment only will decide.—Yours, etc.,

J. E. LEONARD CHINAL, M.D., D.T.M., L.M.

MONGHYR,
14th October, 1924.

INDIGENOUS INDIAN DRUGS.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—At a recent meeting of the Advisory Board of the School of Chemical Technology, Calcutta, the Board noted with satisfaction the progress of the School in respect of the following matters:—

(1) *Technological Education and Drugs' Investigation*.—The series of articles lately issued by the School in connection with technological education suggested various technical lines, including the one of scientific investigation and manufacture of important medicinal herbs and drugs, a specialised subject on which a pamphlet was issued by this School in 1919, showing for the first time the importance and possibilities of the new work and the necessity for co-operation of pharmacologists, chemists and bacteriologists. Recently in a leading newspaper there were long communications on the subject from the Calcutta School of Tropical Medicine and a medical practitioner, the latter going so far as to suggest the creation of a chair in the Calcutta University in commemoration of the memory of the late Sir Asutosh Mukherjee. Both the communications apparently assumed that they were the first to give this new idea to the world, although the pamphlet referred to was appreciatively reviewed by all the leading medical journals in India and abroad so long ago as 1919 (vide *Indian Medical Gazette*, editorial, March, 1919, pp. 101-102).

(2) *Diabetes, Tuberculosis and Leprosy Work*.—The School's work in connection with *Cephalandra indica* for the treatment of diabetes was noticed in the January 26th issue of the *Pharmaceutical Journal*, London, and an order was received last month from an American firm for the supply of this drug, which was promptly complied with. The work on *Alhuni sativum* which was published in 1922 in several medical journals, including the *Indian and Eastern Druggist*, London, is meeting with some success, there being orders from all over India for supply. The last but not the least is the work since 1917 on *Hydnocarpus wightiana* (published in the June, 1923, issue of the *Antiseptic*), although its present sponsors in their campaign against leprosy do not consider it necessary to refer to it.

(3) *Draft Bill to control dispensing and drug adulteration*.—The School has been working very hard since 1919 for a Pharmacy Act for dispensing to be carried out only by qualified persons, as in most civilised countries, and for a Food and Drugs Act to prevent the widespread adulteration of foodstuffs now obtaining in India. The latest information was collected and embodied in a draft bill which would have been moved in due course by Dr. Moreno, but for the present prorogation of the Bengal Council. It is noted that there has been a recent awakening amongst the industrialists and manufacturers in Delhi for the establishment of an up-to-date laboratory for analytical purposes to facilitate the extension to the imperial capital of the Punjab Food Adulteration Act. It is, therefore, all the more necessary that the second city of the British Empire should maintain her lead in the matter by encouraging the public to become sufficiently interested in the subject and to avail themselves fully of the opportunities offered by the Calcutta School of Chemical Technology.—Yours, etc.,

J. C. GHOSH,

Hon. Secretary, School of Chemical Technology, Calcutta.

CALCUTTA,
September 15th, 1924.

A DISCLAIMER: COLLOID OF CALCIUM.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—In the October number of the *Indian Medical Gazette* there appears on page XI an advertisement of a substance called Collo-Calcium produced by the Anglo-French Drug Co. (Eastern), Ltd., in which a quotation

appears under my initials from an article published by me in the *British Medical Journal*, January 14th, 1922, p. 53, under the title "The Treatment of Tuberculosis with Colloid of Calcium." My article was based on experiments made with colloidal calcium prepared by the Crookes' Laboratory, London, which was made sufficiently clear in the concluding paragraph which runs:—"In conclusion, I wish to express my thanks to Sir Malcolm Morris for the interest he has taken and the encouragement he has given me during this investigation, and to Mr. J. Ward, chief chemist to the Crookes' Laboratories, for preparing the drug and for much valuable information concerning its properties." It was with reference to this particular preparation that my article was written and it is most unwarrantable for a firm to advertise something which is completely different in every way and lead the unwary to infer that they were getting the real thing. That this preparation of Crookes' is a most valuable therapeutic agent when given correctly I have no reason to doubt, but I have not the slightest knowledge as to the therapeutic value of the drug advertised by you; I should therefore feel obliged if you will publish this disclaimer. No doubt this advertisement crept in without a correct knowledge of the true facts of the case.—Yours, etc.,

EDWARD E. PREST, M.A., M.D. (Cantab.),
Medical Superintendent, Ayrshire Sanatorium and
Consulting Physician to the Ayrshire Joint
Tuberculosis Committee.

November 10th, 1924.

Service Notes.

APPOINTMENTS AND TRANSFERS.

Lieutenant-Colonel J. R. J. Tyrrell, Agency Surgeon, Bundelkhand, is appointed to officiate as Political Agent in Bundelkhand, in addition to his own duties, with effect from the 30th October 1924 and until further orders.

His Excellency the Chancellor of the Delhi University is pleased to appoint Lieutenant-Colonel G. D. Franklin, O.B.E., I.M.S., Civil Surgeon and Chief Medical Officer, Delhi, to be a member of the Academic Council of the Delhi University.

Major P. F. Gow, D.S.O., M.B., I.M.S., officiating Civil Surgeon, Rajshahi, is appointed to act as the Civil Surgeon of Darjeeling, with effect from the 25th October 1924, *vice* Lieutenant-Colonel A. H. Proctor, I.M.S., granted leave.

Major C. H. Smith, I.M.S., is appointed to officiate as an Agency Surgeon, with effect from the 18th April 1922.

In modification of the orders already issued, Major H. King, I.M.S., officiating Assistant Director, Central Research Institute, Kasauli, is appointed temporarily to act as Director, Pasteur Institute of India, Kasauli, with effect from the afternoon of the 2nd October 1924. He will, in addition, be in charge of the statistical work of the Assistant Director, Central Research Institute, Kasauli.

The services of Major G. T. Burke, M.D., I.M.S., are placed temporarily at the disposal of the Government of the United Provinces, with effect from the date on which he took over the officiating appointment of Professor of Medicine, King George's Medical College, Lucknow.

Captain H. S. Anand, I.M.S., is attached as Advisory Chemist to the Medical Stores Depot, Madras, with effect from the forenoon of the 18th October 1924, *vice* Captain A. F. MacCulloch on leave.

The services of Captain O. R. Unger, I.M.S., are placed temporarily at the disposal of the Government of Bihar and Orissa for employment in the Jail Department, with effect from the date on which he assumes charge of his duties.

The King has approved the transfer to the temporary non-effective list of Captain Mahdo Prasad, M.B., I.M.S., with effect from the 3rd October 1924.

LEAVE.

Lieutenant-Colonel A. H. Proctor, I.M.S., Civil Surgeon of Darjeeling, is allowed leave for 6 weeks, with effect from the 25th October 1924.

In modification of the orders already issued, Lieutenant-Colonel W. W. Jendwine, C.M.G., I.M.S., Civil Surgeon, Simla West, is granted leave for 2 months and 21 days combined with study leave for 2 months and 28 days, with effect from the afternoon of the 8th October 1924.

Lieutenant-Colonel E. O. Thurston, I.M.S., Civil Surgeon, Hooghly, is allowed combined leave for 28 months, with effect from the 1st February 1925.

Major T. L. Bomford, M.D., I.M.S., was on study leave for a total period of 8 months and 8 days, viz. (1) from the 25th September to the 22nd December 1922, (2) from the 14th January to the 24th March 1923, and (3) from the 24th September to the 22nd December 1923, for which lodging allowance was paid to him by the India Office.

Captain C. de C. Martin, I.M.S., is appointed temporarily to the Medical Research Department, and posted as a supernumerary officer at the Central Research Institute, Kasauli, with effect from the date he takes over charge.

Captain J. C. De, I.M.S., has been granted by the High Commissioner for India leave for a further period of 6 months in extension of the combined leave granted to him.

PROMOTIONS.

Lieutenant-Colonel to be Colonel.

Robert Welland Knox, D.S.O., M.B., F.R.C.S., *vice* Colonel Harold John Kinahan Bamfield, D.S.O., K.H.P., promoted to the rank of Major-General, with effect from the 24th September 1924. Colonel Knox's tenure of appointment will count from the 3rd October 1924.

The undermentioned Captains (now Majors), Indian Medical Service to be Acting Majors whilst holding appointments with the Mesopotamian Expeditionary Force:—

1. C. J. Stocker, M.C., M.D., from 4th January 1918 to 9th April 1918 and from 19th December 1918 to 23rd June 1920.

2. A. A. C. McNeill, M.B., from 4th August 1918 to 1st May 1919 and from 12th June 1919 to 31st January 1920.

Major (now Lieutenant-Colonel) W. F. Harvey, C.I.E., M.B., I.M.S., to be acting Lieutenant-Colonel from 2nd October 1916 to 13th December 1916 whilst employed as Assistant Director of Medical Service (Sany.) in Mesopotamia.

RETIREMENTS.

The King has approved the retirement of Major-General B. H. Deare, C.I.E., K.H.S., I.M.S., with effect from the 27th August 1924.

Lieutenant-Colonel W. G. Liston, C.I.E., M.D., I.M.S., with effect from 24th September 1924.

Lieutenant-Colonel J. W. Grant, M.B., I.M.S., with effect from 5th October 1924.

NOTICES.

LONDON MEDICAL EXHIBITION.

THE exhibit of Messrs. Burroughs Wellcome & Co., as in previous years, is notable for several important additions to the varied products of the firm. The exceptionally high standard of 'Wellcome' brand insulin has been raised by new methods of manufacture, while the price has been considerably reduced. The availability of insulin is enhanced by the production of 'Tabloid' hypodermic insulin hydrochloride, which ensures the

administration of a precise dose of insulin, obviates risk of deterioration, and facilitates use by nurse, or even patient, under medical direction.

The 'Soloid' urine-sugar test case which is shown, is designed further to facilitate the examination of diabetic urine. This small portable case contains all the essentials for the qualitative determination of sugar. The 'Soloid' Benedict test supplies a simple method of performing this delicate test which will be welcomed by the physician. With the 'Soloid' products the test is so easy to carry out and so plain in its indications that diabetic patients can make daily examinations of their urine if the physician so desires.

Among the gland products is exhibited 'Tabloid' parathyroid gland. Inspection, checked by microscopic section, ensures the production of authentic parathyroid, thereby safeguarding the medical profession. Various stages in the preparation of gland products are shown, emphasising the fact that the whole gland substance, not extracts are used.

The activities of the firm are further shown by the 'Wellcome' sera and vaccine produced at the Wellcome Physiological Research Laboratories for which Burroughs Wellcome & Co. act as distributing agents. Medicinal plants grown on a commercial scale at the 'Wellcome' Materia Medica Farm, Kent, are shown in a remarkably healthy condition. The importance of the farm from the point of view of the therapeutic activity of the firm's products will readily be realised.

The successful use of 'Iodicin' has led to the production of 'Ethidol' a colourless non-irritating liquid, containing 20 per cent. of iodine, for intraglandular injections and inunction. The external use of 'Ethidol' in conjunction with the internal use of Iodicin enables the iodides to be intensively exhibited.

Bismuth is now placed alongside arsenic and mercury in the treatment of syphilis, and 'Bicreol' bismuth cream, which has a creo-camphor base, appears to be an ideal product for intramuscular injection.

'Wellcome' brand chemicals are represented and many 'Tabloid' and 'Soloid' products—some recently introduced and others well-known the world over—are shown. As usual 'Tabloid' medical equipments and first-aid outfits are displayed, additional interest being added by the fact that the "round the world" flights, American and British, have been equipped with these admirable outfits.

The whole is of great interest to the profession, and proves that Burroughs Wellcome & Co., by virtue of their pioneer and research work, remain ever in the forefront of medical progress.

DIMOL.

Of the evils ascribed to intestinal stasis as the primary ætiological agent there is no end, from puerperal eclampsia and premature senility to infantile convulsions. Whilst those who ascribe some half of the ills to which mankind is heir to this condition, and claim that its cure would eradicate the cancer problem and several others, yet there can be no doubt as to its really baneful influence in inducing diseased conditions in the tropics. Thus in the treatment of the "post-dysenteric abdomen" we often have a picture of mingled visceroptosis, endocrine deficiency and chronic intestinal stasis, replaced by occasional days of intermittent diarrhœa.

Under such circumstances, the medical practitioner seeks for (a) first, some safe and non-irritant intestinal aperient, which we consider that he will find in some form of purified liquid paraffin, which is about the only aperient permissible in conditions of chronic colitis in the tropics; and, secondly, (b) for some really efficient intestinal antiseptic. For "Dimol," the chemical constitution of which is stated to be dimethylomethoxyphenol, it is claimed that it will sterilise the duodenum of bacteria on administration by a duodenal tube, and that it will render the effluent from a Plombières douche to which it is added sterile upon plating 1 c.c. on a

Petri dish of culture medium. Many authorities, including, of course, Sir Arbuthnot Lane and even Frankel, have stated the enormous advances which may result from the discovery of a really efficient intestinal antiseptic; but one by one, those which are introduced appear to fade and die away.

We assert no claims for this product, which we have unfortunately not fully tested, other than those put forward by its agents, the Anglo-French Drug Co. Recently we have seen a case of sprue in a European male patient who had been for years under many different forms of treatment, but who claimed that no other drug had given him such satisfaction and freedom from all symptoms, including that of sore tongue. A report in the *Lancet* of the 24th February, 1923, states that "a lavage solution is capable of killing dysentery bacilli in 2½ minutes." At least the drug appears to be worth trial in all cases where intestinal stasis exists in any of its protean manifestations. The drug is put up in the form of "pulverettes" in tins of 500 at 9s. each; in syrup; as a powder for colonic lavage; as a dusting powder, insufflation powder, and ointment at reduced rates for large hospitals. The prices quoted in the published price list, however, do not include freight and insurance, import duties and landing and clearing charges.

The testimony borne as to the efficacy of the drug by several workers is encouraging. If there is here an intestinal antiseptic of real and proved value, it will be of very considerable interest and importance in medical practice in the tropics.

EDINBURGH EXTRACT OF MALT WITH COD-LIVER OIL.

A PREPARATION which is at least very palatable, and which the makers guarantee to be made from pure materials, is Messrs. Harkness, Beaumont & Co.'s (Leith, Edinburgh) extract of malt with cod-liver oil. It is stated to be free from glucose, dextrinised potato starch and similar adulterations. A patient who was placed on it—a case of suspected phthisis—gained weight very satisfactorily. The Indian agent is R. Krishnaswami, P. O. Box No. 500, Bombay.

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Original Articles.

TYPHUS-LIKE FEVER, PROBABLY TICK-TYPHUS, IN CENTRAL INDIA.

By J. W. D. MEGAW,

LIEUT.-COLONEL, I.M.S.,

Director and Professor of Tropical Medicine, Calcutta School of Tropical Medicine and Hygiene;

F. B. SHETTLE, O.B.E.,

MAJOR, I.M.S.,

O. C., Indian Station Hospital, Saugor,
and

DHIRENDRA NATH ROY, M.B. (Cal.),
D.T.M. (Cal.),

Assistant Professor of Entomology, Calcutta School of Tropical Medicine and Hygiene.

THE cases described in this note are of interest as furnishing fresh evidence of the occurrence in India of a typhus-like fever which is identical with or closely related to the spotted fever of the Rocky Mountains. The senior writer has already discussed Indian cases of fever of this type, in the *Indian Medical Gazette*, in articles published in Vol. LII, 1917; Vol. LVI, 1921; and Vol. LIX, 1924.

He also summarised the existing knowledge of the typhus-like fevers which occur among persons living in close association with the life of the wilds, and brought forward evidence which points to the occurrence of these fevers in South Africa, Nigeria, Australia and Sumatra. In most of these cases the infection is probably carried by a tick from an animal reservoir, but in others the mite is probably the vector. The cases now described were brought to the notice of the senior writer by Major Shettle, I.M.S. The description of the cases, which was given by Major Shettle in his letter of February 1st, 1924, is as follows:—

Equitation School,
Saugor, C. P.

Dear Colonel Megaw,

I believe that some time back I remember reading an article of yours about a fever resembling the spotted fever of the Rocky Mountains. Last year here I had three curious cases of fever which no one could diagnose and I said that I thought that they might be of the dengue group, but much more resembled the tick fever of the Rocky Mountains. There are now some manœuvres on here and I have had several more cases. They all run to a type and I have not heard of any such occurring elsewhere amongst the troops in this district. No one who has seen them can put a name to them.

They have all occurred in persons who have been exposed to tick bites in the jungle around here.

I have seen altogether two cases amongst Indians, about a dozen in European soldiers, and two in officers. I have to-day admitted Colonel —, R.A., for the same disease. The blood of all of the cases is negative to malaria and spirochaetes and nothing can be noted except perhaps leucopenia.

The relative count sometimes shows an increase of mononuclears. The symptoms are all the same and

consist of acute muscular pains and joint pains, headache, pain behind the eyes, furred tongue, sometimes congestion of the conjunctivæ and throat, vomiting once or twice at the commencement, bleeding from the nose and occasionally a little diarrhoea at the commencement. The pains are very like those of dengue and vary considerably with the severity of the case.

There is sometimes an attack of palpitation and the heart sounds become irregular and muffled. In two cases there has been a little temporary tympanites; otherwise, with the exception of one case, abdominal symptoms are absent. The spleen is a little enlarged in most of the cases.

All the symptoms gradually disappear with the fading of the rash, which generally stays out after the temperature has come to normal. The rash appears on any day up to the fifth or sixth day, as far as I can make out; is rubeolar in character and commences on the trunk and extensor surfaces of the limb, particularly on the backs of the hands and soles of the feet and palms of the hands. In mild cases it is very discrete and in severe cases the reverse; it spreads to the face and in the end covers the body.

It lasts in some cases up to 20 days and in the end fades with a very slight desquamation which is not general. If seen after some time it rather looks purpuric, so much so that one officer diagnosed a case as purpura rheumatica, and another case was diagnosed as smallpox.

The fever varies in duration, but generally lasts from 12 to 17 days. It commences about 102° or 103° and then comes down and there are daily remissions, some cases coming to normal daily, so that the chart resembles malaria. The rises gradually get less until the temperature reaches normal; 50 per cent. of the cases are mild. There have been no deaths.

At present I have seven cases in hospital, all in various stages. I have consulted the local Civil Surgeons both last year and this and they cannot put a name to the disease, nor have they seen any locally. The blood has been sent for the Weil-Felix test and no reply has been received yet. But they are not typhus, and I have seen a lot of typhus in India on the frontier. The reports for the typhoid group are not in favour of that disease. I have been in India 20 years and have seen nothing like it before. I wonder if you would agree with my provisional diagnosis?

I think the cases are very well worth seeing and investigating. I am up to my ears in work and have no time. There are no lice on the men's clothes and I think I would have had more cases if it were due to that cause. Bugs have not been found. The rash is not irritating and has not been noticed by the patient in several cases until it has been pointed out or become pronounced.

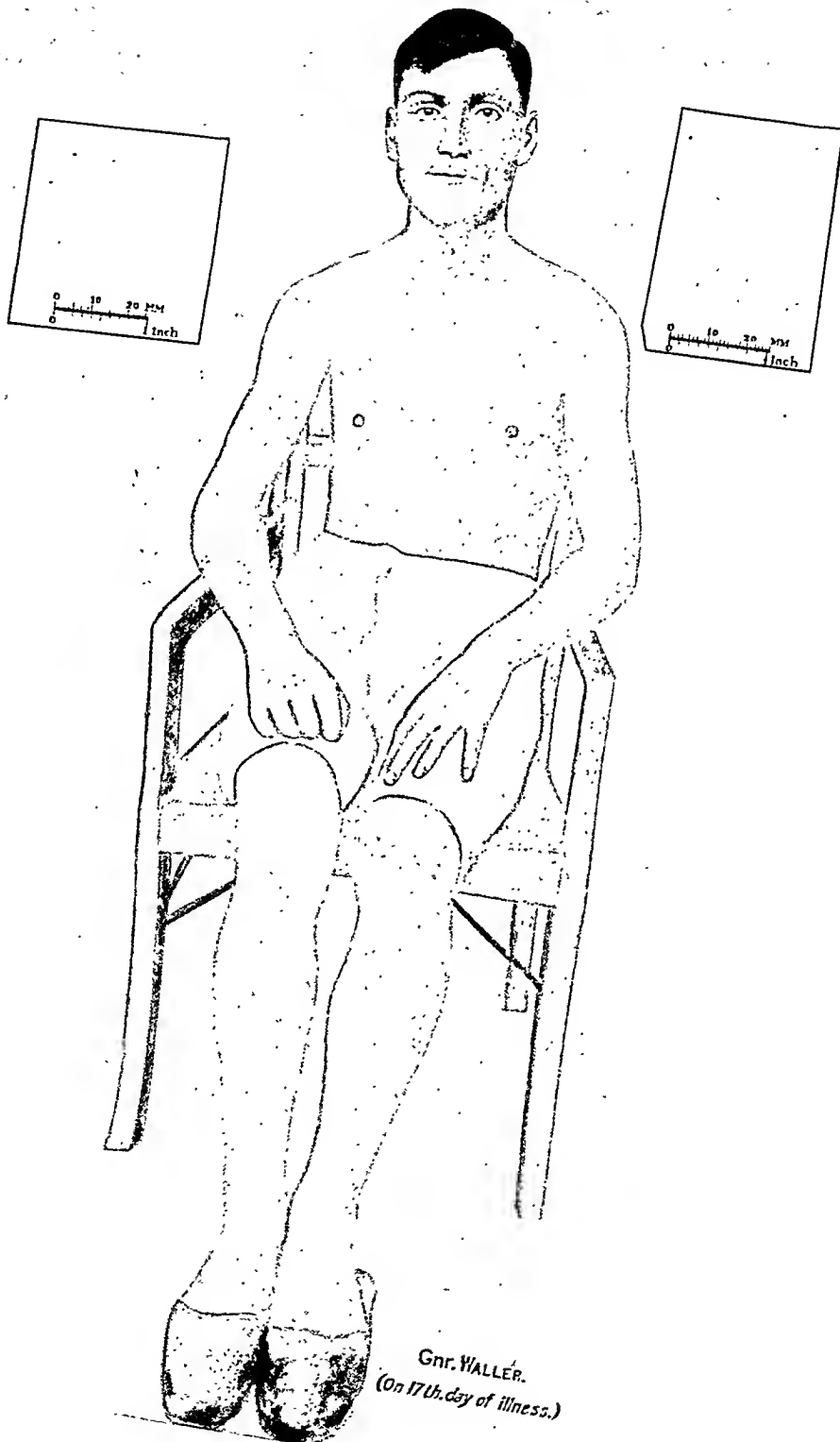
Yours sincerely,
(Sd.) F. B. SHETTLE,
Major, I.M.S.

The following account is written by the senior author, who observed the cases on the 9th and 10th of February, 1924, but most of the detailed observations are due to Major Shettle, Captain Dotivala, I.M.S., and the junior author.

The senior author is indebted to Dr. Strickland, Professor of Entomology of the Calcutta School of Tropical Medicine, for placing Dr. Roy at his disposal for a detailed study of the cases and for many valuable suggestions and criticisms in connection with the work. The main features of the cases have been recorded in the form of charts, tables and illustrations, so that the explanatory text is brief.

PLATE I.

Plate I.



Gnr. WALLER.
(On 17th day of illness.)

any pronounced lymphocytosis, such as is so striking a feature of the mite-borne cases.

2. Conjunctivitis and sore throat were of more frequent occurrence among the cases in this series than in the cases of typhus-like fever recorded from other parts of India in which there was evidence of conveyance by ticks, but conjunctival congestion and bronchial

Chart showing localities in which the patients were for three weeks previous to onset.

| | | DECEMBER, 1923. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | JANUARY, 1924. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----|---------------|-----------------|---|---|---|----|----|----|----|----|----|----|----|----|----|----|--------------|----|----|----|----|----|----|----|----|----|---|---|---|---|---|--------------------|---|---|---|----|----|----|----|----|----|----|----|----|----|----|-------------------|----|----|----|----|----|----|----|----|----|----|--|--|--|--|-------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|-------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|---|
| | | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. | RAM NEWAZ | DHANA CAMP | | | | | | | | | | | | | | | SALUWA MEHAR | | | | | | | | | | | | | | | On march to Mirpur | | | | | | | | | | | | | | | MEHAR | | | | | | | | | | | | | | | + | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2. | GUNNER WALLER | | | | | | | | | | | | | | | | NONGONG | | | | | | | | | | | | | | | JHANSI | | | | | | | | | | | | | | | On march to MEHAR | | | | | | | | | | | | | | | MEHAR | | | | | | | | | | | | | | | + | | | | | | | | | | | | | | | |
| 3. | HODGE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | JHANSI | | | | | | | | | | | | | | | On march to MEHAR | | | | | | | | | | | | | | | MEHAR | | | | | | | | | | | | | | | + | | | | | | | | | | | | | | | |
| 4. | WOOD | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | MEHAR | | | | | | | | | | | | | | | DHANA | | | | | | | | | | | | | | | + | | | | | | | | | | | | | | | |
| 5. | SUNJAN KHAN | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | MEHAR | | | | | | | | | | | | | | | DHANA | | | | | | | | | | | | | | | + | | | | | | | | | | | | | | | |
| 6. | KIRK | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | MEHAR | | | | | | | | | | | | | | | DHANA | | | | | | | | | | | | | | | + | | | | | | | | | | | | | | | |
| 7. | PORTER | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | MEHAR | | | | | | | | | | | | | | | DHANA | | | | | | | | | | | | | | | + | | | | | | | | | | | | | | | |
| 8. | JOACHEEN | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | MEHAR | | | | | | | | | | | | | | | DHANA | | | | | | | | | | | | | | | + |
| 9. | COL. H.N. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | SAILANA | | | | | | | | | | | | | | | DHANA | | | | | | | | | | | | | | | + | | | | | | | | | | | | | | | |

+ Indicates date of onset of fever.

| | | | | |
|--------|-----------------------------|------------------------------------|------------------|--------------------------|
| No. 1. | Probable site of infection | .. Dhana Camp. | Impossible | .. Mehar Camp or Saugor. |
| No. 2. | " " " | .. On march from Nowgong to Mehar. | Possible | .. Mehar Camp. |
| No. 3. | " " " | .. " " " Jhansi to Mehar. | Possible | .. Mehar Camp. |
| No. 4. | " " " | .. " " " Jhansi to Mehar. | Possible | .. Mehar Camp. |
| No. 5. | " " " | .. Dhana Camp. | Impossible | .. Mehar Camp. |
| No. 6. | " " " | .. Mehar Camp. | Possible | .. Dhana Camp. |
| No. 7. | Possible " " | .. (1) Dhana Camp, (2) Mehar Camp. | | |
| No. 8. | Probable " " | .. Dhana Camp. | Possible | .. Mehar Camp. |
| No. 9. | " " " | .. Dhana Camp. | Impossible | .. Sailana. |
| | Probable sites of infection | .. Dhana Camp 4. | Possible sites | .. Dhana Camp 2. |
| | " " " | .. Mehar Camp 1. | " " | .. Mehar Camp 5. |
| | " " " | .. March from Nowgong to Mehar 1. | Impossible sites | .. Mehar Camp 2. |
| | " " " | .. " " Jhansi to Mehar 2. | " " | .. Saugor 1. |
| | | | " " | .. Sailana 1. |

Weil-Felix reactions (only two out of seven cases showed agglutination in dilutions up to 1-80, the others being completely negative), and by the clinical features, which are much more like those of the Rocky Mountain fever than those of louse-typus. The only reasons for doubting that ticks were responsible are:—

1. No ticks were seen by any of the patients on his person, though there were ample opportunities for their being bitten by the ticks which were common in the jungle within the probable incubation period. In this respect the disease differs from many of the cases of Indian tick-typhus which have come to my notice and in which there was a history of tick bite within a few days previous to the onset. In the Saugor cases the tick may have bitten and fallen off without being observed; or there may conceivably have been some other vector such as a mite. There was no evidence of the existence of biting mites in the locality and the disease appears to differ from the mite-borne typhus-like fever of Japan and Sumatra in the absence of any local ulcerated sore in any of the cases, in the absence of any local lymphadenitis and also in the absence of

catarrh are conspicuous features of the Rocky Mountain tick-typhus.

3. The temperature charts differ from most of those seen in the presumed cases of tick-typhus in India in showing greater daily remissions, almost amounting to intermissions in some of the cases. These differences may be merely variations such as usually occur in different groups of cases of the same disease, or they may indicate that the disease is a distinct variety though belonging to the same disease group.

It appears to be probable that the cases belong to the tick-typus group, but in the absence of direct evidence of the bite of this arthropod we are not justified in excluding other possible vectors.

An attempt was made to obtain evidence of the nature of the virus by inoculations of the blood of patients into guinea-pigs: unfortunately the animals were inoculated with blood obtained towards the end of the attack or after the attack. The guinea-pigs were carefully observed by Major Knowles, Professor of Protozoology at the Calcutta School of Tropical Medicine, but no evidence of the

presence of any active virus was obtained. A search for ticks and mites of the jungle was arranged for, but was not carried out as the

insect collector who was engaged for the work decamped without making any serious effort to collect them. When opportunity offers

CHART III.

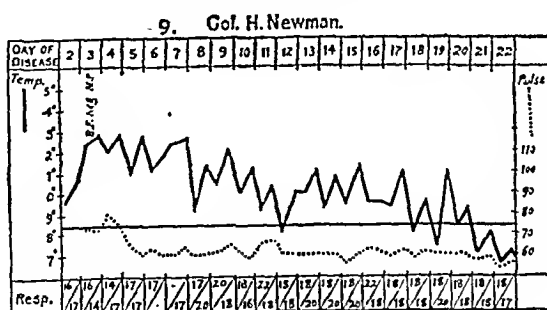
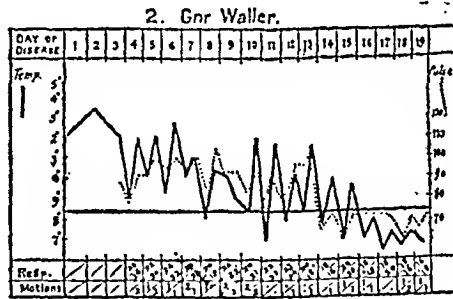
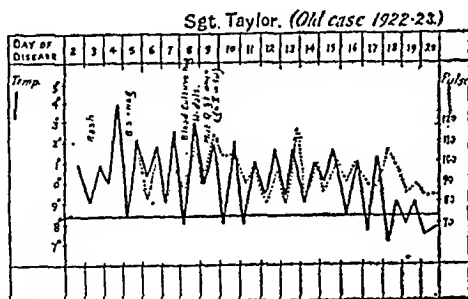
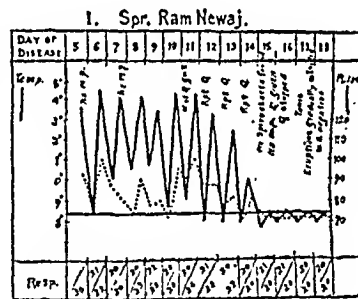
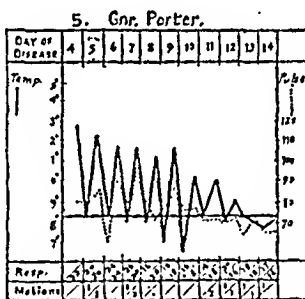
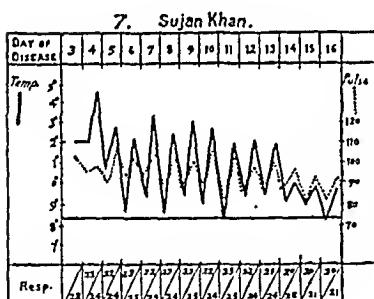
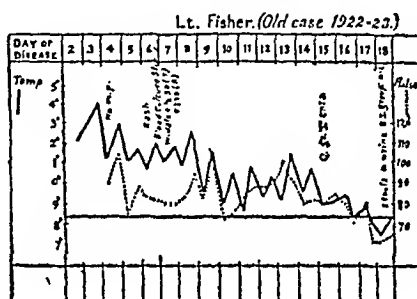
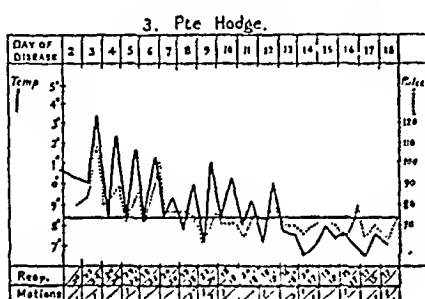
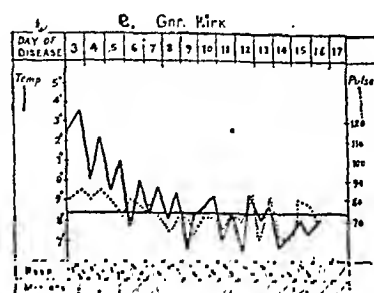
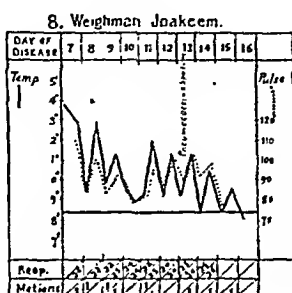
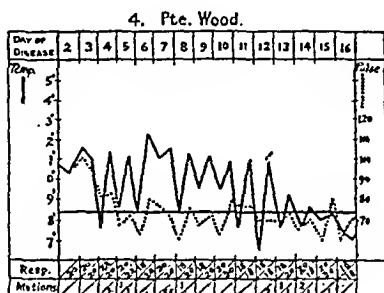
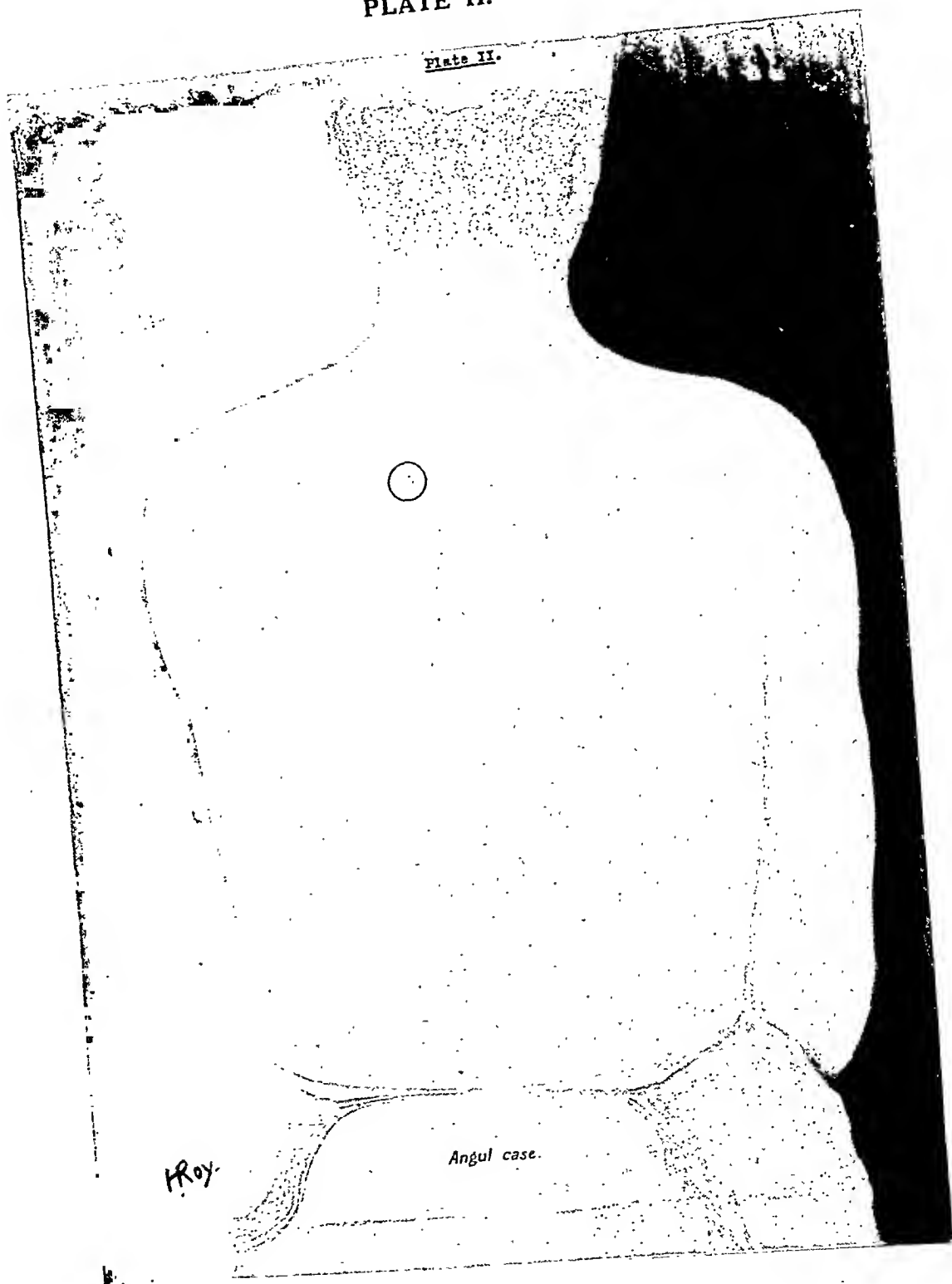


PLATE II.



on will be made.
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the cases were
probably has as
e wilds and the

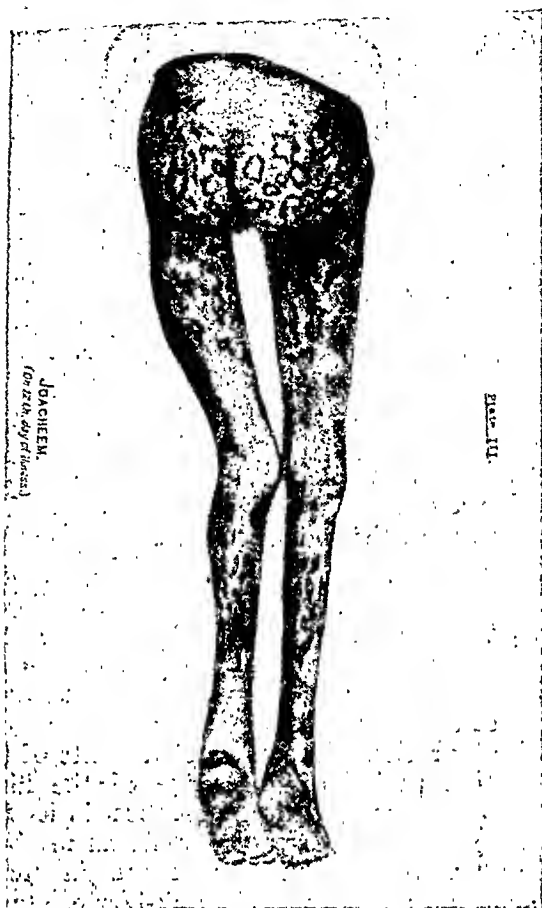
| | Other symp- toms. | Duration fever. | Widal. | Inoculation T.A.B. | Weil-Felix. | Total No. leucocytes. | DIFFERENTIAL COUNT. | | | | Blood Culture. |
|------------------|--|---------------------|--|-----------------------|--|--------------------------|------------------------|------|------|------|-------------------------|
| | | | | | | | Poly. | S.M. | L.M. | Eos. | |
| Sapp N | .. | 15 days | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Gun leys | Drowsy first five days. | 15 days | T=± $\frac{1}{8}$ A=neg. B=neg. 9th day Parel. | June 1923. | Neg. 9th day (Parel.) | 7,600 25th day. | 62 | 26 | 12 | 0 | Neg. 9th d Parel. |
| Pr Hye) | Mild case but con- valescence slow. | 12 days | T=neg. A=neg. B=neg. 19th day Calcutta. | July 1923. | Neg. 4th day (Parel.). + $\frac{1}{8}$ on 19th day (Calcutta.). | 7,600 20th day. | 58 | 29 | 12 | 1 | Neg. 4th Parel. |
| Pr Wye (.) | Drowsy for 14 days. | 13 days | T=+ $\frac{1}{8}$ A=neg. B=neg. 19th day Calcutta. | July 1923. | + $\frac{1}{8}$ on 19th day. (Calcutta.) Neg. 4th day (Parel.) | 6,800 20th day. | 60 | 26 | 14 | 0 | Neg. 4th Pa |
| Gu Peek | .. | 12 days | T=+ $\frac{1}{8}$ A=neg. B=neg. 15th day Calcutta. | Nov. 1923. | Neg. 15th day (Calcutta.). Neg. (Parel.) | 6,200 17th day. | 60 | 26 | 12 | 2 | Ns.) Pa) |
| Gun eye n) | .. | 13 days | T=neg. A=neg. B=+ $\frac{1}{8}$ 3rd day Parel. | Oct. 1923. | Neg. 3rd day (Parel.) | 7,800 17th day. | 59 | 27 | 14 | 0 | N 3rd Pa |
| Suj s. | .. | 20 days | D=+ $\frac{1}{8}$ A=neg. B=neg. 17th day Calcutta. | .. | Neg. 17th day (Calcutta.) | 10,600 18th day. | 65 | 25 | 10 | 0 | |
| Weye. Jo | Very severe case just escaped death. | About 15 days | T=+ $\frac{1}{8}$ A=+ $\frac{1}{8}$ B=+ $\frac{1}{8}$ 12th day Calcutta. | .. | Neg. 12th day (Calcutta.). | 13,200 14th day. | 70 | 21 | 9 | 0 | |
| Col | .. | 20 days | .. | Mar. 1923. | .. | .. | .. | .. | .. | .. | |



R.

r other biting ar-
persons likely to
oping or marching
y of certain parts

PLATE III.



JOACHIM.
(On 12th day of illness.)

PLATE IV.



PRE. WOOD.
(20th day of illness.)

further efforts in this direction will be made. The only evidence of the nature of the disease is of a general epidemiological and clinical nature, but it is certain that the cases were of a typhus-like fever which probably has as its reservoir an animal of the wilds and the

PLATE V.



GR. WALLER.
(26th day of illness.)

PLATE V(b).



GUNNER WALLER.

vector is probably a tick or other biting arthropod of the wilds. The persons likely to be infected are persons camping or marching in the jungle or open country of certain parts

of India, there is no evidence of person-to-person infectivity. The absence of evidence of the occurrence of the disease in persons in the infected localities is not regarded as proof that the disease does not occur among them, it is very likely that it does occur in the form of sporadic cases affecting chiefly the children and that most of the adults are immune owing to attacks in childhood. When it is borne in mind that the disease even in Europeans has not been recognised till recently, it is not surprising that it has not attracted attention among the dark-skinned inhabitants of places where fevers are regarded as matters of commonplace occurrence not calling for any special notice. It is suggested that the cases should be classed as "jungle typhus-like fever, probably tick-typhus" as a provisional measure until more evidence of the vector has been obtained; if the vector should be proved to be a tick the most suitable name will be "tick-typhus." The disease will be discussed in a separate paper by the senior author who has obtained a good deal of further evidence of the occurrence of a tick-borne typhus-like fever in other parts of India.

The photographs, coloured drawings and charts of the cases ought to enable others to recognise the disease, and it is hoped that any cases which are observed will be recorded.

The outstanding clinical features of the disease are clearly shown by the coloured plate, by the temperature charts which have been kept not only in the nine cases recorded, but also in two similar cases which occurred in the same camps a year previously and by the comparative tables. For a comparative table of the features of louse-borne typhus and of the other typhus-like fevers reference may be made to the article in the *Indian Medical Gazette* for February 1924, in which, however, there is a printer's error by which the mortality of louse-typhus is shown as 3 to 6 per cent. instead of 3 to 60 per cent.

INDIAN TICK-TYPHUS.

By J. W. D. MEGAW,

LIEUT.-COLONEL, I.M.S.,

Director and Professor of Tropical Medicine, Calcutta School of Tropical Medicine and Hygiene.

SINCE the paper, in the *Indian Medical Gazette* of February 1924, on the typhus group of fevers was published, a good deal of further evidence has been obtained which points strongly to the existence of a typhus-like fever in India which is conveyed by a tick. This fever is so similar in its epidemiology and symptomatology to the spotted fever of the Rocky Mountains that I should not be justified in giving it any other name, but for the obvious inapplicability of the term "Rocky Mountain Fever" to a disease occurring in India. The term "spotted fever"

has been applied to so many diseases and is so lacking in descriptive quality that it seems best to change the name altogether rather than to retain an unsuitable part of the title. The term "tick-typhus" has the great advantages of indicating the vector of the disease and the disease group to which the affection belongs. The close relationship which obviously exists in the clinical manifestations and the pathological findings of louse-typhus and the tick-borne disease amply justifies the inclusion of the two diseases in one group, just as tick-borne relapsing fever is included in the same group as the louse-borne disease. A well recognised designation of a disease should not be discarded lightly, but in the present case an absolute necessity arises for the change of one part of the name, and as the other part is unsuitable a good opportunity arises for an improvement in the nomenclature.

The fresh evidence of the existence of tick-typhus in India consists partly of the series of cases which have been described in the preceding article and partly of the cases which are reported in tabular form in the present note. In three of these cases there is a clear history of bite by a tick within the usual limits of the incubation period of a disease of the kind. The disease is practically identical in its epidemiological features and its clinical manifestations with the Rocky Mountain fever which has been proved to be tick-borne. In no case of presumed tick-typhus in India was there the slightest evidence of louse infection, although in most of the cases this possibility was closely investigated. Taking all the evidence into account it is easy to explain all the cases on the hypothesis of tick transmission, and no other hypothesis which has been suggested is supported by the facts.

The tick carrier is probably *Rhipicephalus sanguineus*, but it is not possible to make a dogmatic statement to this effect, as in no case has the tick which was found biting a patient been available for identification. The evidence which points to this tick is circumstantial and inconclusive. It is that while in one of the infected zones I found a tick which was attaching itself to my leg, this bore a general resemblance to the tick which conveyed the fever to me some years previously in the same place and it was identified as *Rhipicephalus sanguineus*. It is hoped that the attention which has now been drawn to the point will result in the preservation and identification of the responsible tick in some future cases of the disease.

The only other vector which is at all likely to be responsible is a mite, but there is not the slightest evidence of bite by a mite in any case, and besides the local necrosis with lymphadenitis and the pronounced lymphocytosis which are described in the mite-borne

Further cases of Tick-Typhus in India.

| | Mr. J. F. T. | Mr. J. A. C. | Mr. — | Mr. C. | Sergt. W. | Mr. W. H. | Child J. |
|-----------------------------------|---|--|--|---|--|---|--|
| Race, sex, age | E. M. 42 .. | E. M. 56 .. | E. M. 35 .. | E. M. 35 .. | E. M. — .. | E. M. 32 .. | E. M. 8. |
| Date | February—, 1924 | January 4th, 1924. | January—, 1915.. | .... | February—, 1924. | January—, 1924 | January—, 1924. |
| Locality | Angul (Orissa) .. | Angul (Orissa) .. | Naraingani, Dacca | Akyab, Burma .. | Near Saugor, Central India. Camping in open country. | Balaghat in Central Provinces. Camping tents on site never used before. | Balaghat in Central Provinces. Camping tent on site never used before. |
| Tick bite | Shooting in jungle 1,500—2,500 feet altitude. Bite mark, buttock; tick suspected. | Mark on leg, probably tick bite. | Bite by tick, 7 days before onset. | Tick found crawling on body, 10—14 days before onset. | Ticks abundant in camp, lice excluded. | Tick found fastened on body 8 days before onset. | Tick found fastened on umbilicus, gorged with blood, 2 days after onset. |
| Onset | Chill, malaise .. | Rigor, malaise, headache. | Sudden, severe headache, nausea. | Headache, pain in back and joints. | .... | Gradual, headache, rigors, vomiting. | Sudden, severe headache, pains all over body. |
| Type of fever | Continued .. | Continued .. | Continued .. | Continued at first, then remittent. | Remittent. | Continued at first, then remittent. | Continued. |
| Duration of fever | 21 days .. | 21 days (7 days slight evening fever). | 21 days .. | 11½ days .. | 17 days. | 14 days .. | About 15 days. |
| Fall of temperature | Lysis .. | Lysis .. | Lysis .. | Rapid Lysis .. | Lysis. | Lysis .. | Lysis. |
| Day of appearance of rash | Fifth day .. | Fifth day .. | Third day .. | Fourth day .. | Before sixth day | About second or third day | Fourth day. |
| Parts first affected | Face, forehead .. | Back and legs .. | .... | Arms .. | .... | Face .. | Arms and legs. |
| Rash in early stage | Pink spots, fading on pressure. | Pink spots, fading on pressure. | Rose spots .. | Rose red spots 3—5 mm., slightly raised. | Maculo-papular and macular. | Macular .. | Macular slightly raised.. |
| Rash in later stage | All over body, especially face, forehead; extremities brownish. | Especially extremities, not on face. Bright red, slightly elevated brown. | Trunk and face, petechial. | Dark centres, whole body excluding face, palms and soles. | Petechial on limbs, whole body excluding scalp. | All over body. Petechial. | All over body, few on face. Petechial, typhus-like. |
| Persistence of staining of spots. | Several weeks. (see coloured plate). | Six weeks .. | .... | Faded with fall of temperature. | Persistent staining. | For 2 months .. | More than six weeks. |
| Special features | Bloated face, injected conjunctivae. | Severe headache, pains in limbs and back, injected conjunctivae, face bloated. | Stupor, bronchitis, spleen and slight jaundice, albuminuria. | Eyes suffused .. | Congested conjunctivae, slight sore throat. | Conjunctivae injected .. | Conjunctival injected. |
| Lice | Lice excluded .. | Lice excluded .. | No lice found .. | Lice excluded .. | Lice excluded. | Lice excluded | Lice excluded after thorough search. |
| Isolated case | Isolated case .. | Isolated case .. | Diagnosed as typhus by Col. Anderson, I.M.S. | .... | .... | .... | .... |
| Seen in convalescence. | Seen in convalescence. Wassermann negative. | .... | .... | Weil-Felix 364, negative in higher, eighth and seventh day. | Wassermann negative. | Widal negative. Slight Leucocytosis. | Widal and Weil-Felix negative. Leucocytosis. |
| Reported by.. | Dr. A. K. Mukerji, Civil Surgeon, Angul. | Dr. A. K. Mukerji | Dr. R. M. Mukerji, D.T.M. | Lt.-Col. Waters, I.M.S. | Capt. Williamson, R.A.M.C., <i>Journal</i> , October 1924. | Dr. Brandon and Major Boyd, I.M.S. | Lt.-Col. Barnardo, I.M.S. and Dr. Francis. |

typhus-like fever were entirely absent in the cases reported.

The existence of a typhus-like fever in India conveyed by ticks is reasonably certain, and the accounts of fevers in Nigeria, South Africa and other parts of the world strongly suggest that a tick-borne typhus-like fever occurs in these places.

So far as my own observations go, I feel justified in the belief that the best working classification of the typhus group of fevers is into

- (1) Louse-Typhus.
- (2) Tick-Typhus.
- (3) Mite-Typhus.

There are cases in which the vector is not known: in most of these the clinical picture and the epidemiological features are sufficiently characteristic to justify a reasonably certain diagnosis, but when there is no evidence of the vector and the symptoms are not characteristic it may be necessary to use the term typhus-like fever of unknown vector.

The proposed classification has the merit of calling attention to the typhus-like nature of the fever and its eruption and to the epidemiological features. Although the classification must remain provisional until the knowledge of the fevers is more definite, it will be found to be helpful to the medical man in handling these cases. That such help is needed has been abundantly shown by the serious difficulties in which medical men have often been placed, as the diagnoses of smallpox, syphilis, measles and paratyphoid fever have been made in several cases with the result that grave embarrassment of both doctor and patient has occurred. Other diagnoses like aberrant dengue have been made, and though these have not caused any serious practical difficulties, it is decidedly unsatisfactory that the medical man should find himself in a position in which he is unable to make a diagnosis on which he can base a rational handling of his case. In one case which was seen by six medical men there were six different diagnoses and some of the doctors were harshly and unjustly accused of professional incompetence, although the others whose diagnoses were equally wrong escaped censure. It is impossible to form any idea of the frequency of cases of this disease in India; it is likely that many cases escape notice among children in the endemic areas, and that the majority of the adults in these areas are immune so that the disease is chiefly observed in newcomers from non-affected places. The animal reservoir is not known but hares or other rodents are the most likely.

The geographical distribution is not yet known; cases have been recorded chiefly from Bhim Tal and Sat Tal in the Kumaon hills at a height of 4,500 to 6,000 feet, in the warm

season and from the Central India plateau at heights of 1,500 to 2,000 feet, and from the Orissa forests at about the same height, in the cold season. Isolated cases have been reported from several other localities, so that the disease probably has a wide distribution in the forest and scrub areas of India.

The season of occurrence appears to be the winter in the less elevated regions and in the summer in the higher areas. Prevention is probably on the same lines as in the case of the Rocky Mountain fever, viz., avoidance of tick bite and care in searching for ticks on the body after exposure to possible bites. If the ticks are removed within an hour or two of fastening on the body infection is not likely to occur.

The mortality is low among healthy adults, but fatal cases have occurred and one of the cases personally observed by me was nearly fatal. What is needed is for medical men in India and elsewhere to realise the possibility of the occurrence of the disease and to make observations of the epidemiology and symptomatology or any cases which appear to belong to the disease group.

Brief Summary of the Clinical Features.

The features of the disease may be summarised briefly as follows:—

The patient has nearly always been exposed to the bite of ticks and in some cases the tick has actually been found fastened on the body. After an incubation period which is usually about a week, but which may be as long as three weeks the fever appears, either suddenly with shivering or gradually with step-like rise, usually reaching its maximum within three or four days. Head-ache, pains in the joints and limbs are usually noticed with the onset.

About the third to the fifth day the eruption appears, this at first is a rosy macular or papular rash, the spots being slightly raised in some cases. They disappear on pressure, they are first seen on the limbs and usually extend all over the body. They are rather profuse as a rule and after a few days they become dark red and sometimes petechial. The face, palms and soles are often affected but sometimes escape.

At the height of the fever there is often conjunctival injection and sometimes sore throat. The fever lasts from twelve to sixteen days in most cases, but may last as long as three weeks. The temperature usually falls by lysis. The temperature at first is continuous or remittent, it is usually remittent towards the end. The spleen and liver are often somewhat enlarged. The blood shows a moderate leucocytosis as a rule. The Widal and Weil-Felix reactions are negative in most cases and blood cultures are sterile. Staining after the rash persists in most cases for some weeks. Person-to-person infectivity does not occur, and the cases are usually single unless a number of persons are exposed to the same

conditions. The appearance of the rash and the temperature curves can be gathered more readily from the pictures and charts than from a description.

The symptoms vary a good deal but not more than in other exanthems.

Conclusion.

I believe that it is now reasonable to assert with some confidence that a tick-borne fever of the typhus group occurs in India and the use of the term "tick-typhus of India" or "tick-typhus" will be most appropriate as a provisional designation for the disease. The term "spotted fever of India" has been suggested with a view to indicating the relationship to the known disease which it most closely resembles, but the word "spotted" has been used of so many diseases that it does not convey any precise idea, whereas the term tick-typhus will be applicable to the disease in any part of the world.

NOTES ON CARBON TETRACHLORIDE AS AN ANTHELMINTIC.*

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and

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ALTHOUGH the expulsion of human intestinal worms has been a subject of interest to the medical profession for many centuries, the matter is still one which has not been satisfactorily solved. The qualities to be sought in an anthelmintic are (1) safety for the patient; (2) effectiveness in expelling worms; (3) simplicity of administration on a large scale; (4) lack of unpleasantness in taking or in after effects; and (5) cheapness. No anthelmintic can be expected to reach perfection in any one of these attributes; the problem is, therefore, to find anthelmintics which combine the highest degree of perfection in each of them. Nor is it reasonable to expect that any one anthelmintic will prove effective for all kinds of worms. Even at the present time well-known biological supplies companies are putting on the market patented anthelmintics which are claimed to be effective against such widely different organisms as hookworms, ascaris, oxyuris, and tape-worms. From a zoological standpoint such a universal action would be highly improbable, and practical experience has shown that, up to the present time, no anthelmintic is effective in anything like an equal degree against different kinds of worms.

The treatment of hookworm infections has undergone a very interesting evolution in recent years, and more

advance has been made toward the goal of an ideal anthelmintic for hookworms than for any other common helminthic infection. Until 1880 extract of male fern was most commonly used for the expulsion of hookworms, with very indifferent success. In 1880 thymol was introduced and, with betanaphthol as an alternative, was the classical drug for treatment of ankylostomiasis until seven or eight years ago, when interest in oil of chenopodium was revived. This latter drug steadily gained in favour and by 1921 became almost universally the preferred drug for treatment of both hookworm and Ascaris infections. It is distinctly superior to thymol in every one of the qualifications enumerated above. At the present time thymol has been almost entirely discarded as a remedy for hookworm except by those who are still practising the medicine of five to ten years ago. In 1921 Hall discovered that carbon tetrachloride would remove practically 100 per cent. of hookworms in dogs, and was highly effective for related worms in other animals, and he recommended its trial for the expulsion of hookworms in human beings. Since that time hundreds of thousands of human cases have been treated with the drug in all parts of the world, and it is now accepted in most places as an alternative, if not a substitute, for oil of chenopodium. In the meantime much valuable work has been done on its physiological effects and we now know many of the factors which control its safety, and the precautions which must be taken in its use. It is timely, therefore, to compare the relative values of carbon tetrachloride and oil of chenopodium as regards the qualifications for an anthelmintic enumerated above.

Safety for the patient. No effective anthelmintic so far used has reached the perfection point as regards safety to the patient; all of them do a certain amount of temporary damage and, under certain conditions, may prove fatal. Most anthelmintics are highly poisonous if absorbed into the system, and their toxicity depends to a great extent on the degree to which absorption takes place. Thymol, in the absence of fats or alcohol, is highly insoluble and almost harmless, but in uncontrolled patients, particularly children, fatalities occasionally occur due to ingestion of these substances before the thymol has been eliminated. Oil of chenopodium in an ordinary therapeutic dose of 30 minims for an adult usually produces only slight symptoms of nausea, dizziness and gastro-intestinal irritation, or none at all, but in poorly nourished or fasting individuals, or in very young children, the toxic effects are greatly increased and may be fatal. There is, in fact, a long list of fatalities charged to the use of oil of chenopodium as an anthelmintic. According to McVail (1922) kala-azar patients do not stand chenopodium treatment well, and the drug is contra-indicated in the case of pregnant women (Lambert, 1923a). Since oil of chenopodium is not a simple chemical compound its composition varies, and also its toxicity.

Carbon tetrachloride (CCl₄), on the other hand, is a simple chemical compound, closely allied to chloroform and, therefore, of invariable chemical composition. It does, however, very commonly, in fact usually, contain impurities, the more common of which are carbon bisulphide and phosgene. It has been a

* Read before Indian Science Congress, January 1925.

common opinion that these impurities, even in very small amounts, add greatly to the toxicity of the drug, and that some of the fatalities recorded were due to their presence. Although the evidence for this is far from conclusive, it is important that until more is known about it all samples of CCl_4 for internal use should be analysed by a competent chemist. Major G. C. Boyd, I.M.S., suggests that the following standard of purity be demanded of CCl_4 put on the market for internal use:—

When ten c.c. of the sample are shaken with twenty c.c. of distilled water for five minutes and time allowed for the complete separation of the liquids the wash water employed;

(1) should be neutral to litmus;

(2) should show not more than a slight opalescence when treated with four drops of a solution of silver nitrate (5 gms. silver nitrate dissolved in 100 c.c. distilled water);

(3) should not give any colour with one c.c. of a solution of cadmium iodide (5 gms. cadmium iodide dissolved in 100 c.c. distilled water) and two drops of mucilage of starch.

Twenty-five c.c. of the sample when evaporated on the water bath should leave no residue.

After shaking twenty c.c. of the sample with ten c.c. of pure sulphuric acid for fifteen minutes both the acid and the carbon tetrachloride should be nearly colourless.

A well-cleaned small silver coin should show no darkening when immersed in the sample for ten minutes.

Newcomb's test for carbon disulphide should be negative. One c.c. of the sample is mixed with two c.c. of aniline oil and two drops of ammonia solution (0.0880). After standing five minutes two c.c. of a one per cent. solution (recently prepared) of sodium nitroprusside is added and the mixture shaken. A purple colour in the sodium nitroprusside layer indicates the presence of carbon disulphide. No positive reaction should be obtained with Schiff's reagent.

The benzidine test should be negative.

Very few of the samples submitted to us by chemical firms meet these requirements, but it is hoped that in the near future this condition will be improved.

CCl_4 is much less soluble in water than is chloroform, and even less so than thymol; it is therefore absorbed through the intestinal wall only in small amounts under ordinary circumstances. Recent work indicates that the condition of the patient as regards nutrition and diet has more to do with the toxicity of the drug than has the size of the dose. Under favourable conditions dogs can withstand doses up to stomach capacity (up to 25 c.c. per kilo), or over 80 times the therapeutic dose of 0.3 c.c. per kilo. Monkeys have been given up to 6 c.c. per kilo, which is over 100 times the therapeutic dose first recommended for man. Human doses exceeding 12 c.c. in a single dose (Leach 1922) and 36 c.c. in daily doses of 4 c.c. (Escobar 1922) have been given without apparent ill effect. On the other hand recent work (Schultz and Marx 1924) has shown that doses as low as 0.25 c.c. per kilo may damage the liver in dogs, whereas doses exceeding 1 c.c. per kilo invariably do so. Since it is likely

that the effects of the drug in man are similar to those in dogs, and since the equivalent of a human dose of 3 to 4 c.c. may produce definite hepatic lesions in these animals, there is reason to believe that these doses may also cause some liver damage in man. From this Schultz and Marx conclude that 3 c.c. is almost within the limits of safety but that this dose cannot be exceeded without courting serious damage to the liver, and that there is therefore no margin of safety. It has been pointed out, however, by Phelps and Hu (1924), Schultz and Marx and others that under ordinary circumstances a very high degree of hepatic necrosis, even up to 75 per cent., can be endured by an animal with only slight external evidence of injury, and that the damaged cells are repaired with almost spectacular rapidity; numerous mitotic figures at the edges of the necrotic area can be observed within 40 hours after the administration of the drug, and within a few days the damage is completely repaired. Bose and Mukerji (1924) performed the levulose tolerance test on 8 cases of uncomplicated ankylostomiasis treated with 70 min. CCl_4 in sat. mag. sulph. on two consecutive days, the test being performed from 1 to 18 days after the last dose of the drug. No evidence of disturbance of liver function was found in any of these cases. Schultz and Marx, however, call attention to the danger of necrotic tissue in affording a foothold for bacteria carried from the intestine by the portal veins, and state that infections of this type, usually of a low grade, exert a pronounced influence on the nature of the repair. In such cases marked fibrosis may occur, and they think that such lesions may conceivably go on to a true cirrhosis.

There is evidence, however, that the liver damage can be to a large extent controlled. The simultaneous or subsequent administration of magnesium sulphate affords some protection, and Davis (1924) has shown that the diet has a very pronounced effect. Starvation or a fat diet markedly increase the amount of liver damage, whereas a diet rich in carbohydrates, and to a less extent a protein diet, exerts a very decided protective influence. It is evident that a preliminary starvation period extending over more than a few hours, as is customary with many anthelmintics, is absolutely contra-indicated in the case of CCl_4 . Alcohol has been shown to increase the toxicity of the drug, and it is obvious that cirrhosis or other liver derangement, due to chronic alcoholism or any other cause is a contra-indication. CCl_4 can, however, be given with confidence, as McVail (1922) has pointed out, in cases of kala-azar and malaria during remissions of fever, whereas kala-azar patients stand chenopodium badly. In cases of pregnant women CCl_4 is well tolerated,

Lambert (1923a) reporting the treatment of some hundreds of cases without a single abortion.

The dosage employed for man varies in different hands from 3 c.c. to 10 c.c. or more in single doses. Escobar has given 4 c.c. daily for 9 days. The Philippine Health Service (Leach, 1924) has treated over 35,000 cases with an average dose of 7.5 c.c.; individual doses have ranged from 6.2 to 12.5 c.c. Lambert (1923) in Fiji has treated 60,000 cases with doses of 3 to 4 c.c. for adults, and 3 minims for each year of age up to 15 years; Docherty and Burgess (1922) in Ceylon gave 5 c.c.; Sawyer, Sweet and Shaw (1923) in Australia gave from 3 to 10 c.c.; and McVail in Calcutta gave 60 and later 70 minims on two consecutive days. The dose we now employ at the Calcutta School of Tropical Medicine is a single dose of 70 minims for an adult. The fatalities that have been reported from the use of CCl₄ have not been associated with the larger doses. Lambert had a fatal case in a boy of 5 with a dose of 1 c.c., another in a boy of 7 with a dose of 1.75 c.c., and Phelps and Hu had a fatal case in a boy of 5½ with 1 c.c. Most of the other fatal cases which have been reported have followed the administration of 3 c.c. in adults. Lambert's fatal cases occurred in individuals heavily infected with *Ascaris*, and after the administration of a sample of drug which was found to be far from pure.

To sum up we feel justified in concluding that a dose of from 3 to 5 c.c. (for an adult) of chemically pure CCl₄ is as safe or safer than oil of chenopodium or any other effective anthelmintic, providing the drug is accompanied or followed by a saline purge, and that the patient is well nourished and has a normal liver, refrains from the use of alcohol for a day or two before and after treatment, and is given a diet rich in carbohydrates and poor in fats. The fact that Lambert's fatal cases had heavy *Ascaris* infections suggests that such infection may possibly constitute a contra-indication.

Effectiveness. On the score of effectiveness it is almost universally agreed that a single treatment with from 3 to 5 c.c. of CCl₄ is more effective for *Necator* infections than is a single treatment with 1.5 c.c. of chenopodium, which is the maximum considered safe for routine field work. With oil of chenopodium, Hampton (1922) in Ceylon reports 30 per cent. to 50 per cent. of microscopical cures after 1.5 c.c. (as against 90 per cent. after 3 c.c. of CCl₄); Darling and Smillie (1921) in Brazil got only 14 per cent. of cures from one treatment with 1.5 c.c. (divided), and 41 per cent. from two treatments (divided doses); Caius and Mhaskar (1919) in Madras got 55 per cent. of cures after 32 minims

(divided), but their criterion of cure was the result of a subsequent dose of 60 grains of thymol; Destéfano and Vaccarezza (1924) in Argentina got 30 per cent. of cures (as against 60 per cent. with CCl₄); Cadbury (1924) in China got 58 per cent. of cures from 3 c.c. undivided (as against 36 per cent. with from 3 to 6 c.c. of CCl₄). Darling, Barber and Hacker (1920), however, claim that 1.5 c.c. of chenopodium in three divided doses will remove 99 per cent. of all worms present. This is considerably better than we have been able to do, although it is true that a very high percentage of the total worms present, exceeding 90 per cent., may be removed in spite of a comparatively low percentage of microscopical cures.

The percentage of microscopical cures is not as good an absolute criterion of the effectiveness of an anthelmintic as is an egg-count before and after treatment, but it is useful as a means of comparison, since it is our experience that the percentage of worms removed increases with the percentage of cures, though not necessarily in the same proportion. It is only under exceptional conditions that really reliable data on the percentage of worms removed can be obtained by worm counts. Of 41 cases treated with chenopodium at the Carmichael Hospital for Tropical Diseases in Calcutta by Dr. McVail and ourselves, 30 cases (73.2 per cent.) were definitely not cured by one treatment with 30 minims in divided doses, five cases (12.2 per cent.) were definitely cured, and 6 cases (14.6 per cent.) were doubtful cures in which at most only one or two female worms were left. It should be noted, however, that about one-fourth of these cases had previously resisted CCl₄ treatment and therefore only the more resistant worms remained. The varying results obtained by different workers is probably due in part to varying efficiency of samples of oil, and in part to method of administration, but principally, we think, to the criterion of cure. Our present criterion is a series of 5 or 6 negative examinations, beginning several days after treatment, by the Kofoid and Barber technique. We think it is safe to say that oil of chenopodium in one divided dose of 30 minims eliminates all the female worms in from 20 to 40 per cent. of cases only, whereas two treatments will cure from 50 to 60 per cent. of cases. The drug is less effective for *Ancylostoma* than for *Necator*, but the difference is not so marked as in the case of CCl₄. As regards CCl₄, the percentage of cures with initial doses is distinctly higher. In one series Nicholls and Hampton (1922) got 88 to 90 per cent. of cures in a single treatment, but cured only 2 of 4 children previously treated with chenopodium; Smillie and Pessoa (1923) got 98 per cent. of worms with one treatment; Lambert (1923a) got 94.5 to 99 per cent. of worms with one treatment, although

in one series of 14 cases in which 94.5 per cent. of worms were obtained only 50 per cent. were cured; and Cadbury (1924) in China got only 36.1 per cent. of cures. In a series of cases treated by us in the Alipore Central Jail with the kind co-operation of the Superintendent, Lieut. H. A. Young, I.M.D., we succeeded in curing 96 per cent. of 50 patients, 25 of whom were given 70 minims in mag. sulph., and 25 getting 70 minims in milk without subsequent purge. Only one in each series showed ova by the Kofoid and Barber technique 10 days after treatment. In the cases treated by Dr. McVail and ourselves in the Carmichael Hospital in Calcutta the results have not been so good, and varying results have been obtained according to the method of administration. The results of the various methods are summarized in Table I, in which not only the total percentage of cures and possible cures by first, second and subsequent treatments is given, but also an analysis of the results for pure Necator, pure Ancylostoma, and mixed infections, as well as cases in which worms were not recovered and the species, therefore, undetermined. The latter were probably all light, and presumably the majority of them Necator infections, which may account for the rather high percentage of cures in these cases. The cases grouped as doubtful cures are early cases in which the criterion of cure was not sufficiently rigid to make it sure that all the female worms were eliminated. It will be noted that in practically every instance the percentage of cures for ankylostome and mixed infections is markedly lower than for Necator infections. Sawyer, Sweet and Shaw in Australia got only 21.8 per cent. of cures of pure ankylostome infections with 3 c.c. of CCl_4 , and 30 per cent. with 5 c.c. There is little doubt but that Cadbury's small percentage of cures in Canton was due to a high percentage of cases harbouring ankylostomes, since Darling (1920) has shown that of infected Chinese in southern provinces over 80 per cent. harbour at least part ankylostomes, whereas according to Faust (1923) the percentage of ankylostomes is much greater in the central and northern parts of China. We have had one ankylostome case which was only doubtfully cured after three CCl_4 treatments, four chenopodium treatments, and two beta-naphthol treatments.

To summarize it may be said that a single treatment with from 3 to 5 c.c. of CCl_4 , accompanied or followed by a purge, will cure from 70 to 90 per cent. of Necator infections, and a much lower percentage, probably not over 30 to 40 per cent., of ankylostome infections. CCl_4 is, therefore, much more effective than chenopodium for Necator infections, and approximately on a par with it, or a little inferior, for ankylostome infections. So far

as is known Necator infections predominate in all parts of India.

Simplicity of administration. On the score of simplicity of administration on a large scale, CCl_4 is again distinctly superior to oil of chenopodium. The latter is most effective if given in 3 divided doses, and it must be followed by a saline purge, which means that each patient must be seen four times. With CCl_4 each patient need be seen only once, or at most twice, in case a subsequent saline purge is given. In mass treatments this factor is one of great importance. Furthermore, while chenopodium has to be carefully measured out into 3 capsules for each dose given, CCl_4 can be measured more roughly directly into the fluid to be used as a vehicle.

Unpleasantness and after effects. Hall and Shillinger (1924) state that patients who have previously taken chenopodium or thymol are unanimous in their preference for CCl_4 , and our experience corroborates this. Nearly all patients after taking CCl_4 feel a slight giddiness and often become drowsy, but they do not object to these symptoms. In many cases they are able to carry on the day's work as usual if no salts are taken. Giglioli (1924) reports the loss of only 58 hours of work out of a possible 2,150 hours after the treatment of 252 mine labourers in British Guiana. Nausea is rare and vomiting is less frequent than after chenopodium. In some cases patients become mildly delirious, and in a few instances a transient jaundice follows after one or two days. Chenopodium, on the other hand, is very disagreeable to take, frequently causes nausea and vomiting, and produces dizziness, intestinal irritation, and frequently headache. Alarming symptoms develop more frequently than after CCl_4 .

Cheapness. In cheapness CCl_4 has a decided advantage over oil of chenopodium. With CCl_4 at Rs. 2-8 per pound, the present price for a pure product in Calcutta, a dose of 70 minims works out at approximately $\frac{1}{2}$ anna, and if given in two ounces of milk the cost for a treatment comes to $\frac{3}{4}$ anna. Oil of chenopodium, on the other hand, at Rs. 32 per pound, comes to 2 annas for a 30 minim dose, plus about $\frac{1}{2}$ anna for 3 capsules, making $2\frac{1}{2}$ annas in all. The cost for chenopodium is still further increased if account is taken of the time required for measuring out the 10 minim quantities into capsules ready for dispensing.

Modes of administration of CCl_4 . It was first recommended by Hall that CCl_4 be administered in hard gelatine capsules. In practice, however, this method has only rarely been used, and the simpler method of administration in a fluid has generally been followed, and with as good results. Most workers, including Lambert and Leach who have reported on the treatment of 60,000 and 35,000 cases

respectively, have given it in water. In some instances, it is followed after two or three hours by a saline purge, although the drug itself has some cathartic action. McVail began giving the drug in water, with or without a subsequent dose of magnesium sulphate or jalap powder; later he tried the drug in castor oil, and still later in saturated magnesium sulphate solution as a vehicle; he gave the full dose of 60 to 70 minims in these ways on two consecutive days. Lambert (1923b) has reported on the treatment of 7,000 cases using magnesium sulphate as a vehicle with very good success. Hall and Shillinger (1924), experimenting on dogs, conclude that the action of the drug is not impaired by the simultaneous administration of salts.

Early in 1924 we began using milk as a vehicle, and think that this is the most satisfactory method of administering CCl₄. Hall and Shillinger (1923) report on a single test to determine the effect of CCl₄ when taken in milk, and found the effects more noticeable than in previous tests with capsules. Lamson et al. (1923) found that CCl₄ given an hour after heavy cream was greatly increased in toxicity. Apparently drawing conclusions from this, an editorial in the Journal of the American Medical Ass'n, 1924, states that "it appears more than doubtful whether milk should be used as a vehicle for carbon tetrachloride, as is sometimes recommended." Balfour (1924) repeats this statement. Hall and Shillinger are evidently under the impression that the CCl₄ should mix with the milk on account of its being a fat solvent, but find that the drug nevertheless settles to the bottom. With the assistance of Major A. D. Stewart, I.M.S., we studied the nature of a mixture of CCl₄ in whole milk, skimmed milk, and cream, both macroscopically and microscopically, and found that the drug could be emulsified in skimmed milk quite as readily as in whole milk, being held in a fine emulsion for some time by the colloidal protein particles. We vigorously shake the dose of CCl₄ with a few c.c. of milk in a test tube to get a fine emulsion, and then stir this into two or three ounces of milk. The CCl₄ slowly settles out in the form of larger globules, but this is not sufficient to be evident to the eye for ten or fifteen minutes. In our hospital work we use the natural milk, in which the fat content runs from 4 to 6 per cent. and have had no trouble from it, but for general use we recommend skimmed milk as being equally useful as a vehicle, less dangerous, and cheaper.

We can find no evidence that CCl₄ given in milk produces more symptoms than when given in water or magnesium sulphate. To test this we simultaneously treated 25 prisoners in the Alipore Central Jail with CCl₄ in salts and 25 with CCl₄ in milk without subsequent purge. Nine (36 per cent.) in each

group vomited, but repeated vomiting occurred more frequently in the mag. sulph. group; symptoms of mild intoxication or of abdominal pain occurred in six (24 per cent.) in each group; slight giddiness was remarked by every individual in both groups; a severe jaundice developed in one individual, suffering from tuberculosis, in the magnesium sulphate group. A single examination made ten days later by the Kofoed and Barber technique showed all but one in each group to be negative. The purging was, of course, more marked in the magnesium sulphate group. In our hospital cases the amount of vomiting and intoxication seems to be about the same regardless of the vehicle, but the CCl₄ is less objectionable in milk than in either water or salts. If followed by a saline purge two hours later CCl₄ in milk produces a very high percentage of cures in one treatment, especially in *Necator* infections (*see* Table I). It is probable that the emulsification in milk brings about a more even and thorough distribution in the intestine.

Dr. McVail at the School of Tropical Medicine, assisted by one of us (A. K. M.) tried combinations of CCl₄ and oil of chenopodium on a series of 22 cases, the usual dosage being 45 to 60 minims of CCl₄ in water accompanied by 10 to 15 minims of chenopodium in a capsule. Fifty per cent. of these cases were cured in a single treatment, and 4 of 7 (57 per cent.) who were given a second treatment were cured. These results compare very favourably with any other methods of treatment we have tried, and they warrant further trial especially in places where *Ascaris* infections are common. (Lambert (1923a) reports favourably on the treatment of several hundred cases with a mixture of 1 part of chenopodium to 11 of CCl₄, the latter being used in the usual dosage. Sawyer and Sweet (1924), however, in a series of patients having a high preponderance of *Ancylostoma*, got poorer results from a combination of CCl₄ and chenopodium than from either one alone.

From Table I, which summarizes the results obtained by Dr. McVail and ourselves at the Carmichael Hospital, certain conclusions as regards the method of administration of CCl₄ can be drawn. It is clear that CCl₄ repeated on two successive days, other things being equal, is more effective than a single dose, but since the damage to the liver reaches its maximum about 48 hours after the administration of the drug the second dose takes effect at a dangerous time, and we think that the possibility of serious results is greatly increased by a repetition of the drug in less than 7 or 8 days. Castor oil as a vehicle does not increase the efficiency of the drug, and may be considered dangerous in that more absorption may be expected. Magnesium sulphate as a vehicle or as a subsequent purge does not

TABLE I.

Comparison of Various Methods of Administration of Chenopodium and CCl₄.

| Drug and method of administration. | Adult dose. | Species. | FIRST TREATMENT. | | | | SECOND TREATMENT. | | | | THIRD TREATMENT. | | | | SUBSEQUENT TREATMENT. |
|--|-----------------------|----------|------------------|----------------|-----------------|------------|-------------------|----------------|-----------------|------------|------------------|----------------|-----------------|------------|------------------------|
| | | | Number treated. | PERCENTAGE. | | | Number treated. | PERCENTAGE. | | | Number treated. | PERCENTAGE. | | | |
| | | | | Certain cures. | Doubtful cures. | Not cured. | | Certain cures. | Doubtful cures. | Not cured. | | Certain cures. | Doubtful cures. | Not cured. | |
| Chenopodium 3 capsules 1 hr. apart | 30 min. | N | 22 | 4.5 | 17.1 | 77.2 | 10 | 40.0 | .. | 60.0 | 3 | 33.3 | 33.3 | 33.3 | 1, 4 doses, not cured. |
| | | A | 6 | 16.7 | 16.7 | 66.7 | 2 | .. | .. | 100.0 | 2 | 50.0 | .. | 50.0 | 1, 4 doses, not cured. |
| | | M | 4 | 25.0 | .. | 75.0 | 1 | .. | 100.0 | .. | .. | .. | .. | .. | |
| | | ? | 9 | 22.2 | 11.1 | 66.7 | 4 | 25.0 | 50.0 | 25.0 | .. | .. | .. | .. | |
| | | Tot. | 41 | 12.2 | 14.6 | 73.2 | 17 | 29.4 | 58.8 | 11.8 | 5 | 40.0 | 20.0 | 40.0 | |
| Chenopodium 1 capsule + CCl ₄ in water, salts 2 hrs. later. | 10-15 min. 60-70 min. | N | 10 | 50.0 | 10.0 | 40.0 | 4 | 25.0 | .. | 75.0 | 1 | 100.0 | .. | .. | |
| | | A | 5 | 40.0 | .. | 60.0 | 1 | 100.0 | .. | .. | .. | .. | .. | .. | |
| | | M | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | |
| | | ? | 7 | 42.9 | .. | 57.1 | 2 | 100.0 | .. | .. | .. | .. | .. | .. | |
| | | Tot. | 22 | 45.4 | 4.5 | 50.0 | 7 | 42.9 | .. | .. | .. | .. | .. | .. | |
| CCl ₄ single dose in water, no purge. | 60-70 min. | N | 7 | 28.6 | .. | 71.4 | 4 | 25.0 | .. | 75.0 | 1 | .. | .. | 100.0 | 1, 7 doses, cured. |
| | | A | 2 | .. | .. | 100.0 | 2 | .. | .. | 100.0 | 2 | .. | 50.0 | 50.0 | 1, 5 doses, cured? |
| | | M | 5 | 40.0 | 40.0 | 20.0 | 2 | .. | .. | 100.0 | .. | .. | .. | .. | 1, 4 doses, and |
| | | ? | 14 | 35.7 | 7.1 | 57.1 | 7 | 14.3 | .. | 85.7 | 9 | 55.5 | .. | 44.6 | 1, 5 doses, cured. |
| | | Tot. | 28 | 32.1 | 7.1 | 60.8 | 15 | 13.3 | .. | 86.7 | 12 | 41.7 | 8.3 | 50.0 | |
| CCl ₄ single dose, salts 2 hrs. later. | 70 min. | N | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | |
| | | A | 2 | .. | .. | 100.0 | .. | .. | .. | .. | .. | .. | .. | .. | |
| | | M | 1 | .. | .. | 100.0 | .. | .. | .. | .. | .. | .. | .. | .. | |
| | | ? | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | |
| | | Tot. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | |
| CCl ₄ single dose in castor oil. | 60-70 min. | N | 4 | 75.0 | .. | 25.0 | .. | .. | .. | .. | .. | .. | .. | .. | |
| | | A | 3 | .. | .. | 100.0 | 3 | 33.3 | .. | 66.7 | 2 | 50.0 | .. | 50.0 | 1, 6 doses, cured. |
| | | M | 2 | 50.0 | .. | 50.0 | .. | .. | .. | .. | .. | .. | .. | .. | |
| | | ? | 5 | .. | 80.0 | 20.0 | .. | .. | .. | .. | .. | .. | .. | .. | |
| | | Tot. | 14 | 28.6 | 7.1 | 64.3 | .. | .. | .. | .. | .. | .. | .. | .. | |
| CCl ₄ single dose in castor oil, salts 2 hrs. later. | 70 min. | N | 1 | .. | .. | 100.0 | 1 | 100.0 | .. | .. | .. | .. | .. | .. | |
| | | A | 3 | 33.3 | .. | .. | 1 | 100.0 | .. | .. | .. | .. | .. | .. | |
| | | M | 2 | 50.0 | .. | 66.7 | .. | .. | .. | .. | .. | .. | .. | .. | |
| | | ? | .. | .. | .. | 50.0 | .. | .. | .. | .. | .. | .. | .. | .. | |
| | | Tot. | 6 | 33.3 | .. | 66.7 | .. | .. | .. | .. | .. | .. | .. | .. | |
| CCl ₄ in water, repeated following day, no purge. | 70 min. + 70 min. | N | 8 | 37.5 | 12.5 | 50.0 | .. | .. | .. | .. | .. | .. | .. | .. | |
| | | A | 5 | 20.0 | .. | 20.0 | .. | .. | .. | .. | .. | .. | .. | .. | |
| | | M | 6 | 16.7 | 60.0 | 83.3 | .. | .. | .. | .. | .. | .. | .. | .. | |
| | | ? | 6 | 66.7 | 33.3 | .. | .. | .. | .. | .. | .. | .. | .. | .. | |
| | | Tot. | 25 | 36.0 | 16.0 | 48.0 | .. | .. | .. | .. | .. | .. | .. | .. | |
| CCl ₄ in water, repeated following day, purge 2 hrs. later. | 70 min. + 70 min. | N | 6 | 66.7 | .. | 33.3 | 1 | .. | .. | 100.0 | .. | .. | .. | .. | |
| | | A | 3 | .. | .. | 100.0 | 3 | .. | 33.3 | 66.7 | 2 | .. | 50.0 | 50.0 | 1, 4 doses, cured? |
| | | M | 3 | 33.3 | .. | 66.7 | 2 | .. | 50.0 | 50.0 | 1 | 100.0 | .. | .. | |
| | | ? | 6 | 16.7 | 50.0 | 33.3 | 1 | .. | .. | 100.0 | .. | .. | .. | .. | |
| | | Tot. | 18 | 33.3 | 16.7 | 50.0 | 7 | .. | 28.6 | 71.4 | .. | .. | .. | .. | |
| CCl ₄ in castor oil, repeated following day. | 70 min. + 70 min. | N | 20 | 40.0 | 15.0 | 45.0 | 3 | .. | .. | 100.0 | 2 | .. | .. | 100.0 | |
| | | A | 9 | 22.2 | 11.1 | 66.7 | 4 | .. | 50.0 | 50.0 | 2 | .. | .. | 100.0 | |
| | | M | 15 | 40.0 | 33.3 | 26.7 | 3 | .. | .. | 100.0 | 1 | 100.0 | .. | .. | |
| | | ? | 24 | 62.5 | 8.3 | 29.2 | 3 | 33.3 | 33.3 | 33.3 | .. | .. | .. | .. | |
| | | Tot. | 68 | 45.6 | 16.2 | 38.2 | 13 | 7.7 | 23.1 | 69.2 | 5 | 20.0 | .. | 80.0 | |
| CCl ₄ in 1 oz. mag. sulph., repeated following day. | 70 min. + 70 min. | N | 81 | 49.4 | 25.9 | 24.7 | 15 | 20.0 | 6.7 | 73.3 | 7 | 42.8 | 28.6 | 28.6 | 1, 5 doses, not cured, |
| | | A | 23 | 13.0 | 74.0 | 13.0 | 9 | 11.1 | 11.1 | .. | 5 | .. | .. | 100.0 | 1, 4 doses; 1, 5 doses |
| | | M | 11 | 27.3 | 9.1 | 63.7 | 3 | 66.7 | .. | 33.3 | 2 | .. | 50.0 | 50.0 | not cured. |
| | | ? | 28 | 42.8 | 35.8 | 21.4 | 3 | 66.7 | .. | 33.3 | 1 | .. | .. | 100.0 | |
| | | Tot. | 143 | 40.5 | 37.8 | 25.7 | 30 | 26.7 | 6.6 | 66.7 | 15 | 20.0 | 20.0 | 60.0 | |

TABLE I.—(Contd.)

TABLE I.—(Contd.)

| Drug and method of administration. | Adult dose. | Species. | FIRST TREATMENT. | | | | SECOND TREATMENT. | | | | THIRD TREATMENT. | | | | SUBSEQUENT TREATMENT. |
|---|-------------------|----------|------------------|----------------|-----------------|------------|-------------------|----------------|-----------------|------------|------------------|----------------|-----------------|------------|-----------------------|
| | | | Number treated. | PERCENTAGE. | | | Number treated. | PERCENTAGE. | | | Number treated. | PERCENTAGE. | | | |
| | | | | Certain cures. | Doubtful cures. | Not cured. | | Certain cures. | Doubtful cures. | Not cured. | | Certain cures. | Doubtful cures. | Not cured. | |
| CCl ₄ in milk, repeated following day, salts at same time. | 70 min. + 70 min. | N | 6 | 50.0 | 16.7 | 33.3 | 1 | .. | .. | 100.0 | 1 | .. | .. | 100.0 | |
| | | A | 1 | .. | .. | 100.0 | .. | .. | .. | .. | .. | .. | .. | .. | |
| | | M | 3 | .. | .. | 100.0 | 2 | 50.0 | .. | 50.0 | .. | .. | .. | .. | |
| | | ? | 1 | .. | .. | 100.0 | 1 | .. | .. | 100.0 | .. | .. | .. | .. | |
| | | Tot. | 11 | 27.3 | 9.1 | 63.6 | 4 | 25.0 | .. | 75.0 | .. | .. | .. | .. | |
| CCl ₄ in milk, single dose, no purge. | 70 min. | N | 14 | 42.8 | .. | 57.2 | 5 | .. | .. | 100.0 | .. | .. | .. | .. | |
| | | A | 1 | .. | .. | 100.0 | .. | .. | .. | .. | .. | .. | .. | .. | |
| | | M | 4 | .. | .. | 100.0 | 3 | .. | .. | 100.0 | .. | .. | .. | .. | |
| | | ? | 3 | 66.7 | .. | 33.3 | 1 | 100.0 | .. | .. | .. | .. | .. | .. | |
| | | Tot. | 22 | 36.4 | .. | 63.6 | 9 | 11.1 | .. | 88.9 | .. | .. | .. | .. | |
| CCl ₄ in milk, single dose, salts 2 hrs. later. | 70 min. | N | 13 | 76.9 | .. | 23.1 | 2 | .. | .. | 100.0 | .. | .. | .. | .. | |
| | | A | 1 | .. | .. | 100.0 | 1 | .. | .. | 100.0 | .. | .. | .. | .. | |
| | | M | 5 | 20.0 | .. | 80.0 | 2 | .. | .. | 100.0 | .. | .. | .. | .. | |
| | | ? | 3 | 66.7 | .. | 33.3 | 1 | 100.0 | .. | .. | .. | .. | .. | .. | |
| | | Tot. | 22 | 59.1 | .. | 40.9 | 6 | 16.7 | .. | 83.3 | .. | .. | .. | .. | |

N=Pure Necator; A=Pure Ancylostoma; M=Mixed infections; ?=Species undetermined.

reduce the efficiency of the drug, and it is known to reduce its toxicity. Milk as a vehicle, if followed by a saline purge, is as effective as any method of administration we have tried, and is least objectionable. A combination of CCl₄ and chenopodium is very effective and deserves further trial.

CCl₄ in the treatment of other intestinal worms. CCl₄ is generally considered to be less valuable in the treatment of Ascaris than of hookworm infections, both in dogs and man. Chopra and McVail (1923) found that the drug had little action on Ascaris *in vitro* and conclude that it is not likely to be of much use clinically. Leach (1924) succeeded in curing only 9.4 per cent. of 53 cases. However, of 25 cases treated at the Carmichael Hospital 11 (44 per cent.) were cured by a single treatment of two doses of CCl₄ on successive days, mostly in castor oil or magnesium sulphate. Of 6 cases given a second treatment 3 were cured. With oil of chenopodium we have had 56.7 per cent. of cures and with santonin 75 per cent. (Chopra and Chandler, 1924). A single dose of CCl₄ in milk followed by magnesium sulphate was less effective, only 1 of 5 cases being cured. CCl₄ accompanied by chenopodium was highly effective in the few cases in which it was tried, 5 out of 6 cases becoming negative after one dose. Four of six cases which were not cured by CCl₄ subsequently became negative after one treatment with chenopodium, whereas in one instance four subsequent treatments with chenopodium were necessary to effect a cure.

In the case of Oxyuris also CCl₄ has a very decided action. No definite comparisons can be drawn because it is impossible to determine a cure by microscopical methods, and reinfections occur so commonly that a subsequent presence of worms is little indication that all the worms present at the time the drug was given were not eliminated. We can only say that the number of worms eliminated after oral administration of CCl₄ is as great or greater than with any other anthelmintics we have tried. In 6 of 16 cases given subsequent treatments with CCl₄, chenopodium, or other anthelmintics no more worms were passed, and in each of 3 more cases given 3 or 4 subsequent treatments only one more worm was passed; in only 5 of the 16 were more worms passed on subsequent treatments than on the first. In one case 1,314 Oxyuris were passed after the first CCl₄ treatment, and over 250 after the second. We have also experimented with enemata consisting of 6 c.c. of CCl₄ emulsified in 6 ounces of warm milk (adult dose). The patient is given a strong dose of salts the night before treatment and is treated in the morning after his bowels have emptied. The foot of the bed is raised about a foot and with the patient lying on the right side the milk is slowly injected as far into the colon as possible. The enema is not irritating and the patient can usually hold it easily for two hours, after which he is asked to expel it. The Oxyuris which are passed are all dead and those passed on the next day are in a state of partial disintegration. We treated 7 cases which had

passed one or more Oxyuris after CCl_4 by mouth, but 5 of these failed to pass any more worms after this or subsequent treatments. One case which had passed a total of 8 worms after 3 previous treatments, two with CCl_4 and one with chenopodium, passed 5 worms. Another case which had passed only one Oxyuris after oral CCl_4 passed 15 females and 11 males. Two other cases which were passing Oxyuris in the stools but had had no previous anthelmintic treatment were each given a series of 3 rectal injections at intervals of 3 days. One passed 24, 3 and 2 worms and the other 26, 165, and 24 worms respectively after the 1st, 2nd and 3rd injections. While these data are insufficient to warrant any definite conclusion as to the value of the treatment, they are at least promising. It is suggested that in severe Oxyuris cases a carefully administered enema of CCl_4 in milk, to be retained for two hours but not longer, together with the usual oral dose given simultaneously, followed by salts in two hours, might produce very good results. It is, of course, necessary in any Oxyuris treatment that precautions be taken against reinfection. Eight of the nine patients, who were given the rectal injection in a dosage of 6 c.c., complained of no symptoms, whereas one who was given 8 c.c. complained of giddiness for several hours after. Lamson et al. (1923) have shown that absorption of CCl_4 takes place in the large intestine after large rectal injections and that some liver damage results. When diluted in milk, however, and only retained for two hours, it is likely that very little absorption takes place, and a dose of 6 c.c. can be injected with confidence in patients of 12 years or more if well nourished and in good health.

Out of well over a hundred cases harbouring Trichuris only two or three have passed any of these worms after CCl_4 treatment, and none has been cured of the infection. The drug also has little or no action on Strongyloides, or on tapeworms, either Tænia or Hymenolepis. Its anthelmintic action, therefore, so far as the common human intestinal worms are concerned, is limited to hookworm, ascaris and oxyuris.

SUMMARY.

1. An anthelmintic should be judged on the basis of (i) safety for the patient; (ii) effectiveness in expelling worms; (iii) simplicity of administration on a large scale; (iv) lack of unpleasantness in taking or in after effects; and (v) cheapness. No one anthelmintic can be expected to be effective for all kinds of worms.

2. As regards safety to the patient, CCl_4 in a dose of from 3 to 5 c.c. can be regarded as being as safe as any effective anthelmintic, and distinctly safer than oil of chenopodium,

providing certain precautions be taken. The drug should come up to a certain standard of purity; it should be accompanied or followed by a saline purge; it is contra-indicated in badly under-nourished or very weak individuals; fats and alcohol should be avoided when it is used; cirrhosis or other liver derangement is a contra-indication; and a diet rich in carbohydrates and poor in fats is indicated. It can be given with confidence to kala-azar and malaria patients during remissions of fever, is well tolerated by young children, and is safe for pregnant women. In these latter respects chenopodium is distinctly inferior.

3. In effectiveness CCl_4 is distinctly superior to chenopodium in eliminating Necators, whereas it is approximately on a par or a little inferior in removing ankylostomes.

4. In simplicity of administration on a large scale CCl_4 has a distinct advantage in the number of times it is necessary to see each patient, and in that capsules are not required.

5. A single treatment with CCl_4 costs from $\frac{1}{2}$ to $\frac{3}{4}$ anna, whereas a single treatment with chenopodium costs $2\frac{1}{2}$ annas, plus the cost of filling capsules.

6. CCl_4 has been administered in capsules, or in water, castor oil, magnesium sulphate, or milk as a vehicle, with or without a subsequent saline purge. We recommend a 70 minim dose in skimmed milk followed by a saline purge. A combination of CCl_4 and chenopodium is also very effective, and especially valuable where ascaris infections are common.

7. CCl_4 has a distinct ascaricidal action, especially when combined with chenopodium. Alone it is a little less effective than either chenopodium or santonin. CCl_4 given orally seems to have a more decided action on oxyuris than any other anthelmintic we have tried. Promising results have been obtained in a few cases from rectal injections of the drug in warm milk. This combined with a dose by mouth is worthy of more extensive trial. The drug has little or no action against Trichuris, Strongyloides, or tapeworms.

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GAUCHER'S TYPE OF SPLENOMEGALY IN A MAHRATTA VILLAGE, WITH A CASE TREATED BY SPLENECTOMY.

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With Pathological Notes

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THE village of Dhagur, 9 miles N. W. of Nasik, was inhabited until recently by a population of about 400, living in some 80 houses, Mahrattas in the centre, with Kolis and Chamars on the outskirts. It was well situated on sloping ground, well drained and exposed to the west. Water supply was from a *nala* about half a mile away down the slope.

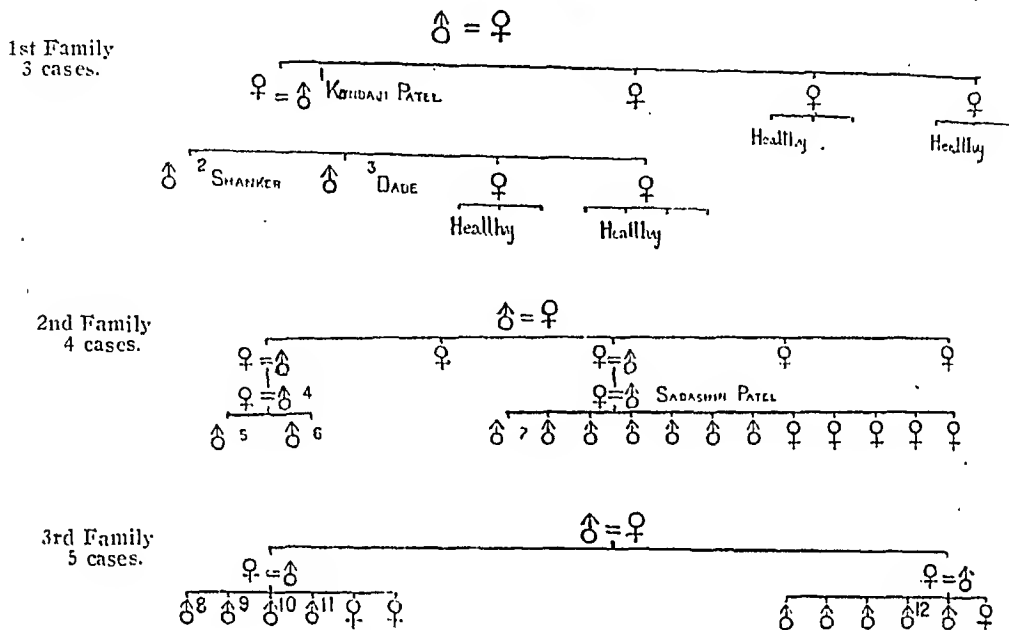
It is now deserted and the former inhabitants live in two villages, $\frac{1}{2}$ to 1 mile away. The older inhabitants state that the migration is solely due to a disease which has in recent years carried off a considerable number of their young males, a disease they dread; which has earned for the village the name of *potedhagur* (*pote* = big stomach). This disease, they state, is always fatal after a number of years, beginning at an early age and attacking only the Mahrattas. They are well acquainted with malaria, which also attacks them, but does not spare either sex or any age or caste. The disease they speak of begins in infancy or early life with abdominal enlargement associated with a large lump in the left side. There is a low type of fever and progressive weakness, and death always results in early adult life.

I am informed by Dr. J. Munsiff, Assistant Director of Public Health, that there is no kala-azar in this district, and the case to be

detailed was certainly not an example of that disease.

A table shewing the distribution of 12 cases of the disease in 3 families is appended. Other cases are spoken of, but are not so clearly known to the villagers who were interviewed. The Kolis and Chamars have always lived in

moderate development; face puffy, conjunctivæ moderately anæmic, tongue clean; appetite not good and digestion poor; lungs healthy; heart normal except for a hæmic murmur. *Abdomen* markedly prominent, especially in the upper half, with bulging of the lower ribs and visible enlargement of the liver and spleen. The usual round scars from branding over the spleen, some not quite healed. A moderate degree of ascites present.



| | | | | | |
|------|----|-----------------------|----|-------------------|-----------------------------|
| Case | 1 | contracted disease at | 15 | and died at about | 35. |
| " | 2 | " | " | " | 6 " living, operation case. |
| " | 3 | " | " | " | 1 " died at about 14. |
| " | 4 | " | " | " | 12 " " " 30. |
| " | 5 | " | " | " | 2 " " " 13. |
| " | 6 | " | " | " | 2 " " " 9. |
| " | 7 | " | " | " | 10 " " " 25. |
| " | 8 | " | " | " | " |
| " | 9 | " | " | " | " |
| " | 10 | " | " | " | " |
| " | 11 | " | " | " | " |
| " | 12 | " | " | " | " |

the village with them, but have not suffered from the disease. Marriages in the Mahratta families have been with people of other villages.

No fresh cases have yet occurred in the new villages.

Shankar Kondaji is the only case seen personally, as there is at present no other case living. It is stated that all the previous cases have exactly resembled his, but it must be added that occasional cases from other villages of severe ascites in young males associated with cirrhosis of the liver or kidneys have been treated in the hospital.

Shankar Kondaji, aged 16, came to the Civil Hospital, Nasik, on 21-7-1924, for abdominal tumour and weakness. These symptoms began at about the age of 6, shortly followed by a low type of fever without rigors. Fever has been more or less continuous and the weakness and abdominal distension are increasing, but he has had practically no pain. He is very much afraid of the disease as his father and brother both died of it, the latter during the present year. He asked for the tumour to be removed by operation.

Physical examination; a boy of short stature and

The spleen forms a large tumour, occupying the majority of the left and upper diagonal half of the abdomen. Its lower end reaches to the left iliac fossa and its anterior border crosses the middle line just above the umbilicus. Its consistence is hard and it is movable only within small limits.

The liver is also greatly enlarged and its lower edge extends 3 finger breadths below the costal margin, which is much more horizontal than usual.

The other abdominal viscera are normal, there is no oedema, the urine is normal, and there is no palpable enlargement of any other lymphatic tissue.

In hospital there was no fever. Blood films shewed no malarial parasites and no leukaemia; differential count approximately as found later by Colonel Mackie. The Wassermann reaction was negative. The aldehyde test for kala-azar was negative, which, with a history of such length, almost certainly excludes kala-azar, and as the serum in addition remained fluid for 48 hours after addition of the formalin, malarial cachexia can (in the writer's experience) be also excluded.

The patient was given a potassium iodide mixture, ung. hydr. rubr. over the spleen and 3 doses of 3 grains of atoxyl hypodermically. He shewed no improvement, in fact he seemed to be slowly getting weaker. He daily asked for splenectomy, and as the disease had now been diagnosed as Banti's disease, his request appeared to me to be sound. Colonel Mackie, who

happened to be in Nasik, very kindly saw the case with me and also considered that the operation was justifiable as offering the only chance of saving the boy's life.

Operation, 1st September. Under chloroform, the abdomen was opened by a median incision 7 inches long, beginning just below the ensiform cartilage. Later the upper end of this incision was carried outwards about 3 inches towards the 9th left costal cartilage to enable the diaphragmatic adhesions of the spleen to be dealt with. The splenic pedicle gave much trouble, being greatly thickened and complicated with adhesions. Its veins were very large and tortuous and tore under the least strain, so that several times the most formidable hæmorrhage had to be stopped in the depths of the wound by using the extended fingers of the left hand as clamps until large clamps could be applied behind the fingers. Adhesions bound down the spleen to the lateral abdominal wall, to the intestines and to the diaphragm, the latter being strong and giving trouble on account of their depth in the wound. These adhesions having been divided, the spleen was freed laterally and turned forwards so that the deepest part of its pedicle and the gastro-splenic and lienorenal ligaments could be ligatured and cut. Finally the tail of the pancreas was separated and the spleen removed. It weighed 3 lbs. 3 ozs. The abdomen was cleaned of blood clot, filled with hot saline and closed.

The patient remained critically ill until the 3rd, with restlessness and increasing distension. The latter was relieved with 4-hourly injections of pituitrin combined with eserine. On the 3rd he was somewhat better, but on the 4th his temperature went to 104.8° with rapid respiration and signs of congestion at the left base. Trouble at the base was not surprising considering the dense adhesions separated just below the diaphragm here. However, he did well and by the 7th his condition was excellent.

As his general condition improved, the shape of the lower ribs became more normal, but the liver remained much enlarged below the costal margin. The patient became less anæmic and the digestion much better. The liver must have undergone reduction, as the ribs over it came down better.

He left hospital on the 22nd September, three weeks after the operation, and immediately resumed light work in the fields near his village. He was seen again on 26th October in good health and able to be out at work all day. His liver was still palpable but smaller.

I am greatly indebted to Colonel Mackie for his interest in the case and for the pathological notes given below. Also to my surgical assistant, Mr. Sheikh, for enquiries at the village and for much practical help.

REMARKS ON THE PATHOLOGY OF THE DISEASE.

By F. P. MACKIE,

LIEUT.-COLONEL, I.M.S.

As I happened to be in Nasik at the time, I was privileged to see this interesting case and it reminded me of a series of similar cases I saw when last in Nasik in 1907. On that occasion the diagnosis was similarly in doubt and I remember assisting the Civil Surgeon (then Capt. Novis, I. M. S.) to remove the spleens of two cases. We encountered the same difficulties in the operation which Capt. Spackman describes, and, as with his case, the immediate results were successful.

These splenomegalies are common in India, and though the majority can be attributed to

malaria or kala-azar, there are other types which cannot be attributed to these diseases. I have encountered such cases in all parts of India, cases characterised by progressive enlargement of the liver and spleen with moderate and varying degrees of anæmia, terminating with dropsy of the extremities and ascites. Such cases have been searched for malarial and Leishmania infection without success and their causation is quite obscure.

Megaw has suggested that some of these are due to chronic formative peritonitis resulting from repeated attacks of dysentery, and though this may explain some cases, which show chronic fibrosis of the capsules of the spleen and liver with recurrent ascites, it does not account for the class of case such as we are considering in which there is progressive enlargement of the spleen and liver and which show no evidence of chronic peritonitis.

I used to think that these cases were similar to those of Egyptian splenomegaly, the causation of which has been for so long a puzzle, but it appears from recent literature that the Egyptian disease is due to chronic hyperplasia and fibrosis due to schistosome infections. From the work which Dr. Fairley and I have been recently doing on the *Schistosoma* infection of Indian goats it is certain that the brunt of the irritation brought about by ova deposition is borne by the liver, and the splenic hyperplasia is secondary and due to the interference with the portal circulation in the liver.

Schistosome infections of man are not known in India and it is improbable that this form of splenomegaly is brought about by such parasites.

Of the other types of splenomegaly, there remain to be considered those described by Gaucher, Banti, Von Jaksch, Hayem-Widal and the Chauffard-Minkowski syndrome which all have some points in common and the differential diagnosis of which is extremely difficult. Some of these, particularly the last named, have a marked familial incidence. This feature has been well brought out by Spackman's case and other points in the history point suggestively to some kind of transmissible infection.

No opportunity was afforded in this case of doing a blood count nor the detailed pathological investigation which one would have liked to do, but it is certain that there was no marked anæmia and the blood picture did not suggest any disease of the blood-forming organs.

The leucocyte count was as follows:—

| | |
|--------------------|--------------|
| Polynuclears | 59 per cent. |
| Lymphocytes | 30 " |
| Large mononuclears | 8 " |
| Eosinophiles | 3 " |

The red cells were normal, and no abnormal cells were noted.

The sections of the spleen showed moderate thickening of the capsule but no increase in the fibrous trabeculae. The Malpighian corpuscles were decidedly reduced in number and some were undergoing a hyaline change. The general appearance under the low power suggested an alveolar arrangement of the splenic parenchyma and great reduction in the lymphoid tissue. The alveoli were seen to contain numbers of large polyhedral cells of endothelial type with large circular feebly-staining nuclei.

No Leishmania or other parasites could be seen and the general structure was light and open and not at all resembling the dense hyperplasia and fibrosis usually seen in protozoal diseases. These characters in general and the overgrowth of endothelial cells in particular decided one in regarding the disease as that of Gaucher's type of splenomegaly.

A Mirror of Hospital Practice.

A CASE OF CONTRACTURE OF THE MOUTH.

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In the *Indian Medical Gazette* for last August a case is recorded by Dr. Holland of gangosa in Baluchistan, illustrated by a photograph. The following are particulars of a case which somewhat resembled the case illustrated in that photograph.

Alamelnammal, a Hindu female, aged 25, was admitted to this hospital on the 18th December, 1922, into the venereal section with ulcers on both lips of the mouth of three years' duration, and ulcers on the labia and vagina of six years' duration. She was very emaciated and anæmic. The lower lip was raised here and there above the surrounding tissues; the rest of the ulceration hard to the touch; in the genitalia the ulceration extended completely around the vagina and involved the whole of the labia and extended back as far as the anus. The ulcers looked very red and inflamed, with areas of slough intervening in places.

Dr. M. A. Khalique treated the case as one of infective granuloma by intravenous injections of tartar emetic. The Wassermann test was at first negative; no other blood examina-

tions were made or local scrapings taken. The local conditions in the mouth and genitalia improved, but the patient's lips became adherent and the mouth rapidly contracted.

The patient was taken over by Rai Sahib D. S. M. Trasi, M.B., for plastic operation. There were some nodules at the lips and it was feared that the operation would might break down. The Wassermann test on the 4th April, 1923, was now reported to be moderately positive; but further injections of antimony were given. The patient's mouth became so much reduced in size that it would only admit a rubber catheter, and for a long time she had to be fed through a catheter. Unfortunately no photograph was taken.

This case differed in several respects from that reported by Dr. Holland. There was no depressed scar below the circular orifice of the mouth, and no radiating scar tissue. The alæ of the nose were not affected.

Operation.—The patient was operated on by Rai Sahib Dr. S. M. Trasi under chloroform anaesthesia on the 2nd July, 1923. Flaps were cut and the skin flap stitched to the mucous membrane of the upper lip, and the mucous membrane flap brought out and stitched to the skin of the lower lip. The operation was a success, and the patient had a re-formed mouth. The patient has been subsequently seen by me from time to time; no change has taken place, the mouth is satisfactory, and there has been no recurrence of the granuloma.

The following points are of interest in the case:—The patient is a native of Madras, and although cases of yaws are occasionally encountered in Madras, the disease does not appear to have been yaws. Infective granuloma is very common in Madras in both sexes; it has been met with in such uncommon situations as the feet and face, although most commonly in the pudenda and groin. Infective granuloma in the genitalia does not lead to destructive changes in the deeper tissue, and among the cases which I have seen no dense scar tissue is left to lead to irregular and unsightly contracture. Recurrences are common, and I have known a patient who has not been benefited even after five years of continuous treatment with injections, x-rays and excision.

Is it possible that the mouth lesions and those in the genitalia were of different origin in this case? The response to antimony treatment is a feature of interest in the case. The ulcers in no way resembled those of yaws. Although the Wassermann reaction was positive at the second test, no anti-frambæsia or anti-syphilitic treatment was given. The case does not appear to have been one of true gangosa, but one simulating that condition.

Indian Medical Gazette.

FEBRUARY.

RECENT WORK ON THE DIAGNOSIS AND TREATMENT OF TROPICAL DISEASES.

It is impossible to review the year's work on tropical diseases in a brief note; most of the progress of the year has been of a gradual kind but very important advances have been made.

Malaria.—In malaria diagnosis has been made more accurate by the wider adoption of the thick film method and by the more general realisation of the need for repeated blood examinations in early cases of suspected malignant tertian infection. In such cases many disasters have happened in the past because a single negative blood examination has been accepted as excluding malaria. In treatment, the trend of opinion is to rely more on the well tried and safe method of administration of quinine or other cinchona alkaloids by the mouth; this has fallen into undeserved disrepute in the past because enough attention has not been paid to the frequent failures on the part of the patient and dispenser to ensure the actual administration of the doses which have been ordered. When care is taken to avoid the fallacy that it is enough to write a prescription and leave the rest to the mercy of unwilling patients and dishonest compounders there is rarely cause to complain of the results. This point has been repeatedly stressed by some Indian workers, but too often those who have little experience of the pitfalls connected with quinine administration still fall into error. Probably the same fallacy holds with regard to quinine as a preventive, it is impossible otherwise to explain the incredible differences which occur in the recorded experiences of various observers. The use of deliberately produced inoculations of benign tertian malaria in the treatment of general paralysis of the insane has emphasised a point of great importance; viz., that recently acquired infections are probably very much easier to cure than relapsing cases. Malaria would appear to behave in the same way as syphilis and amoebiasis in this respect, and it is likely that the treatment of the future will differ very much according to the duration of the disease. There will not be one standard treatment for the disease but several, and it is likely that the treatment of recent infections will be shorter than the existing standard of two or three months, while the treatment of old relapsing cases will probably take the form of several short courses with periods of intermission of the drug. No final opinion can yet be expressed on the relative values of the various alkaloids of cinchona, but stress is being laid on the necessity for bringing the reaction of the blood to the optimum condition by the administration of alkalis. In this

connection we believe that it is a mistake to withhold quinine in serious cases until the bowels and the blood have been attended to: the first dose should be given at once and the alkaline and purgative treatment can be started at the same time. By doing so there will be no waste of valuable time before making the attack on the parasite.

The intramuscular use of the cinchona alkaloids is unreservedly condemned by some, while by others it is regarded as the best method. Our view is that in cases of persistent vomiting or of failure to absorb the drug by the alimentary canal it may be necessary to give one or two doses by the muscle and to run the slight risk of local necrosis, but such cases are very exceptional. Intramuscular injections must be given with a full sense of responsibility and should be confined to the cases in which they are considered to be the lesser of two evils. Intravenous administration should also be regarded as an exceptional procedure and should be reserved for the cases in which instant action is essential. We do not yet know the best way of treating malaria, but we have reached a stage at which malaria can be treated more safely and effectively than any other of the great diseases.

Kala-Azar.—Kala-azar can now be diagnosed more certainly than formerly and at an earlier stage. Blood culture in the hands of experts is being used much more widely than formerly; unfortunately, the technique is difficult and few are in a position to adopt this method, so that the barbarous spleen and liver puncture have still to be employed by many. The cases in which these are required are now fewer because the simple aldehyde test has proved so reliable in longstanding cases that they can be excluded, while blood culture appears to be suitable for the earliest cases.

Difficulty in diagnosis is experienced especially in the cases of splenic enlargement which resemble kala-azar but which are due to the so-called splenic anæmia. These cases are often treated by a course of antimony, naturally without benefit. Cases of syphilitic fever with enlargement of the spleen are often indistinguishable from kala-azar apart from serum tests and effective blood culture tests, and there are other conditions in which chronic fever with enlarged spleen give rise to difficulties of diagnosis.

The treatment of kala-azar has reached an interesting stage. The newer forms of antimony like urea stibamine and Von Heyden's 471 appear to be effective in many cases which are refractory to the older drugs. Whether the efficacy of these drugs is partly due to the fact that large quantities of antimony are introduced into the body in a short time remains to be seen, but for general use neither of these drugs is available in sufficient quantity and at reasonable prices. When they are on the market at cheap rates it will be possible to estimate their value by wider trials. There is an unfortunate tendency to use the word "cure" too optimistically in connection

with kala-azar. Even scientific workers sometimes consider that a single negative blood or spleen culture at the end of a course of treatment is a guarantee of cure. The experience of Ehrlich in the early days of salvarsan ought to be a warning in this matter, and we hope that the results of a long series of consecutive cases which have been kept under observation for prolonged periods will soon be available, so that we can judge of the permanency of the cures which result from short intensive courses of treatment. There is already good reason to believe that the new drugs constitute powerful additional weapons in the struggle against the disease. The advances which have been made in the investigation of the method of spread of infection will be dealt with elsewhere; in this respect the outlook is decidedly promising.

Amœbiasis.—The treatment of amœbic dysentery has not crystallised to the same extent as that of malaria. Emetine is still the most popular drug, its action on the vegetative forms of the parasite is comparable with that of quinine in malaria. It is in the chronic cases that real differences of opinion are found. The future must decide whether repeated courses of emetine with long intervals of rest for the elimination of the drug, or the use of some of the newer remedies like yatren and stovarsol form the best treatment of these cases. The present tendency is to avoid drastic courses of treatment by unpleasant and irritant drugs like emetine bismuth iodide which were in fashion some years ago. It is believed by some that the cures which resulted in some cases from these were due to the violent irritation of the bowel rather than to the superior efficacy of the drug as an amœbicide. There are so many cases of chronic carrier infection with the parasite of amœbic dysentery but without symptoms that it is doubtful whether it is desirable to subject all of these to a long and drastic treatment. Possibly the best method will be to give them short courses of treatment at intervals and to keep them under observation for a long period. The carriers who have no symptoms should be instructed to regulate their diet and manner of life, especially in the matter of alcoholic indulgence. They are probably more liable to acute attacks of dysentery than the rest of the community and from their ranks many cases of hepatitis and liver abscess are drawn. They are also important as sources of infection, and it is essential that further work should be done to determine the significance of the carrier condition both to the individual and to the community.

Stovarsol has been found to give excellent results in a few cases in the temporary freeing of carriers from their cysts; it is too soon to say that these results will turn out to be uniform or permanent; should they be confirmed in a large series of cases the drug will be of great value as it is easy to take and does not interfere with the ordinary routine of life. More attention is

being paid to the possibility of secondary infections with other organisms in chronic amœbic cases, possibly the value of stovarsol and the other arsenicals will be found to be especially great in cases with secondary spirochaetal infections. Yatren may also owe some of its value to its influence on secondary bacterial infections.

Emetine periodide has not been widely tested; it is well worth further trial, but much work has still to be done before we can dogmatise on the difficult subject of the treatment of chronic amœbiasis of the bowel.

Dengue.—The causal organism of dengue has yet to be discovered, the spirochaetes which have been reported by certain workers cannot yet be accepted, and even if their existence were admitted there is reason to doubt whether the disease in which they occurred was really dengue. The charts which were published indicate that the disease is one in which the second rise of temperature occurs about ten days after the first onset, whereas in typical dengue the second rise occurs about five days after the onset. For this reason it seems likely that the disease was not dengue but a disease closely related to infective jaundice. It further resembles that disease in the occurrence of jaundice in some of the cases. The clinical distinction between dengue and sandfly fever is just as difficult as ever, many of the cases cannot be differentiated on clinical grounds, and in such cases it is only when there is reasonable certainty as to the insect vector that the differential diagnosis can be made. For this reason we adhere to the view that it is better to class the two diseases in one group and to use the names "sandfly dengue" and "mosquito dengue" when the vector is known. When the vector is not known the term "fever of the dengue group" is the only one which can reasonably be applied. Even in the case of yellow fever there are several workers who deny that Noguchi has established the causal relationship between the spirochaete and the disease, but this is a point on which workers in India cannot express an opinion.

Attention may again be called to the existing confusion between the Japanese seven-day fever and the seven-day form of dengue which was described by Rogers. At least two of the most popular text-books fall into the error of confusing these diseases, one of which is a form of dengue while the other is related to infective jaundice.

Leprosy.—Leprosy has definitely been removed from the class of incurable and untreatable diseases. The results of early treatment by modern methods are fully equal to those obtained in early tuberculosis, and there are good reasons for the belief that a well thought out plan for early treatment, combined with segregation of the more infective victims and educational propaganda, will enable India to deal effectively with the scourge. It would seem that the dawn of hope has already appeared, thanks to the persistent efforts of Sir Leonard Rogers and his devoted band of followers.

Plague.—This disease is likely to fade into insignificance during the next decade or two, though recrudescences of its activity may be expected on such a scale that further strenuous efforts are still needed for its control. The elimination of rats is one of the most promising lines of effort. Here we are not dealing with a risky or expensive experiment but with a procedure which will pay, apart altogether from its influence on the incidence of plague. It is becoming more and more evident that the rat population is proportional to the food supply which is available for these animals; we have only to eliminate the wasteful feeding of rats and plague will automatically come to an end. Inoculation and evacuation still have important places in the campaign when the disease appears, but they will rarely be needed if the rat population is kept under strict control.

Relapsing Fever.—This disease is much more important and much more widely spread in India than had been realised a few years ago. The disease must be suspected and looked for, otherwise it will continue its ravages. When the disease is detected the means of control are exceedingly simple provided that the persons who are affected agree to co-operate.

Typhus.—Typhus fever is a minor problem in most places in India but it is likely that many parts of the country are affected by a tick borne disease of the typhus group. This is related to the spotted fever of the Rocky Mountains and may possibly be identical with that disease. It has been discovered to exist in many of the jungle or semi-jungle tracts of India, but its presence is only detected when persons enter these areas from outside. The tick now comes into prominence in India as a probable vector of disease from jungle animals to man, and the name tick typhus will probably come into use.

Cholera.—The continued existence of this disease is a disgrace to India. Every civilised country of the world has freed itself from the cholera menace; if a determined effort were made in India the same result would be obtained. Inoculation has proved itself to be a most valuable means of controlling the disease; this is impracticable under present conditions in most places in India, and there is good reason to press on with the investigation of the value of oral vaccines which have been claimed to be effective in other parts of the world. There is much difference of opinion as to their value, but it is necessary that the method should be tested under conditions which will enable us to form a definite opinion as to its value and efficacy. The prophylactic use of essential oils has been so favourably reported on by some workers in India that it ought to be given an extended trial. This method—like oral vaccination—has the great advantages of simplicity and harmlessness. The real solution of the cholera problem consists in the detection, isolation and complete cure of the infected persons, including the carriers.

Bacillary Dysentery.—This disease is coming to be regarded as an infection which is almost universal throughout most places in India; children in this country are probably attacked at an early age, some degree of immunity results from these attacks, but this does not afford complete protection, so that when any individual has his resistance lowered by disease of other cause he is liable to a severe form of the disease. Also when persons are crowded together under conditions in which intense and virulent infection is likely to occur there may be epidemics in spite of the existence of a relative immunity.

Recent work goes to show that prisoners in jails can be protected by isolation of all who show naked eye indications of the disease on stool inspection. Oral vaccination is on its trial; if it should prove to be effective it will be a very useful means of protecting communities in which the disease shows signs of becoming epidemic.

The diagnosis of the disease is being simplified, the reaction of the stools, and examination of stained smears of the exudate give good working indications of the nature of the disease. Elaborate bacteriological methods have not proved satisfactory in practice, owing to the difficulty of obtaining fresh stools at an early stage of the disease and to the difficulties of the technique.

In addition to the well recognised sequelæ of the disease, attention has been called to the occurrence of a chronic peritonitis giving rise to ascites and it is believed that most of the cases which have formerly been diagnosed as cirrhosis of the liver in India are caused by improperly treated bacillary dysentery. There are also reasons for thinking that chronic parenchymatous nephritis may result from damage to the kidney by the toxins of the dysentery bacilli. It is not yet sufficiently clearly recognised that cases of bacillary dysentery should be handled on the same lines as typhoid fever, infection of contacts is just as likely to occur in India in bacillary dysentery as in typhoid fever.

Sprue.—This disease continues to be one of the mysteries of tropical medicine. It is probable that a close study of the conditions of life of the classes of the community which are chiefly affected might yield suggestions of value in determining the causes of the disease and the means of prevention.

Sprue is essentially a disease of the European and Anglo-Indian communities in India so that it is likely that there are certain factors which predispose these to the disease.

Possibilities are:—I. Intestinal stasis associated with a diet consisting largely of animal food and containing too little undigested residue. II. Overstimulation of the cells of the digestive organs which are called into special activity in the digestion of animal food. This over-stimulation may be followed by atrophy in the same way as happens to the islands of Langerhans in the case of the carbohydrate feeders in Bengal. Sprue might thus be analogous to the diabetes of

Bengalis. III. Climate and exercise must be taken into account, though these in themselves do not account for the disease.

The above suggestions are at any rate worthy of consideration, as attempts to show an association of the disease with special micro-organisms have not hitherto yielded satisfactory results.

The recently suggested treatment by parathyroid and calcium lactate has been widely tried in India, but the results are not so striking as in England, though further trials should be made.

Beriberi and Epidemic Dropsy.—Much of the work done during the past few years strongly tends to support the old view that these diseases are closely associated with rice intoxication, but the part played by vitamine deficiency is emphasised by most of the workers and the infection view has still its supporters.

Although there are some points which are still far from clear in connection with the disease, it is possible to lay down clear rules for its prevention. The diet of all persons should contain a sufficient amount of all the necessary vitamins, if this point is attended to the vitamine factor will be excluded. The rice that is used should be prepared and stored by methods which have been proved to be satisfactory by past experience, and if cases of the disease appear the rice supply should at once be changed, or better still rice should be excluded from the diet for a time, the suspected rice being used for animal food or destroyed. Indian experience shows that attention to vitamins alone is not enough to ensure freedom from the disease, rice preparation and storage appear to be the most important points in connection with the epidemic dropsy type of the disease. In practice person to person infection has not been found to be a factor of importance, but infection of the storage places of the rice cannot be ignored.

Hookworm Disease.—Treatment has received more attention than the other important aspects of the disease. Carbon tetrachloride appears to be the most powerful drug in hookworm disease. With reasonable precautions mass treatment with this drug can be carried out safely, and it is likely that periodical treatments will reduce the infestation of labour forces to a negligible quantity at a very small cost. The rare cases in which death occurs unexpectedly from the drug still await a satisfactory explanation.

Importance is now attached to the time of year at which the treatment is carried out. During the hot weather when soil infection is reduced to a minimum, a course of mass treatment is likely to cause a great reduction in the soil infection during the ensuing rainy season, whereas a similar treatment during the rains may be followed by rapid reinfestation of the persons who have been treated. It is hoped that investigation will be carried out on the important question of the degree of disability which is caused by hookworm infection in India. It is quite possible, for example, that 80 per cent. of a labour force may be

lightly infected without any serious diminution of efficiency, but no definite opinion can be expressed on this subject without carefully controlled experiments. There is a tendency to undue pessimism as to the result of preventive measures such as proper latrine accommodation. This has resulted from the tendency to record only percentages of carriers without taking into account the more important question of the average number of worms harboured by the individuals who are infected. When the reduction in the average number of worms which are harboured is taken into account, the value of latrines and mass treatment becomes much more evident.

The part played by pigs and other domestic animals in disseminating infection in the soil is receiving attention. Altogether there is still much to be learned about hookworm disease, and it is likely that if the efforts which are being made at present in different parts of the world are properly co-ordinated, accurate knowledge will be acquired more rapidly than has been the case in the past.

Filariasis.—The treatment of this disease is still unsatisfactory, no drug has been discovered which will destroy the parent worm without danger to the life of the patient. The part played by secondary infections is being studied and the treatment of these is likely to be greatly improved in consequence.

Guinea-worm Disease.—Guinea-worm disease is being closely studied in India. The clinical manifestations are being clearly stated and the rational treatment of the disease is being placed on a sound basis. The value of emetine as a cure has not been established and prevention still remains the most hopeful line of progress.

Cancer.—Cancer is too often regarded as a disease which is rare in the tropics, the truth is that certain forms of the disease such as the Kashmir *kangri* cancer, the betel chewer's cancer and cancer of the penis may be regarded as tropical diseases. A good many years ago the writer of this review had the hardihood to assert that many forms of cancer are avoidable and he called special attention to irritation as a proved factor of the greatest importance in the causation of the disease in India. At last irritation is receiving a due share of attention, but there was a remarkable degree of reluctance to accept irritation as an essential factor until the disease was experimentally produced in animals by the application of irritants. The comparative study of the incidence of cancer among different classes of persons and its association with special points in their environment is likely to yield important information in connection with the prevention of the disease.

GENERAL.

The year 1924 has produced much work of first class importance in the acquisition of knowledge of tropical diseases; there has been a great deal of clearing up of doubtful points and many lines of research have reached a position in which

there is great promise for the future. Co-ordination of research still leaves much to be desired but steady progress in this direction is being made. The conferences of medical research workers which have been held in Calcutta during the past two years have done much to secure this desirable object, but the Government of India and some of the local governments in India show a remarkable reluctance to encourage the interchange of visits between Indian medical research workers and those of other tropical countries, in spite of the fact that the cost of reciprocal visits is the merest trifle in comparison with the results which are likely to be obtained. In some directions the outlook is not so promising as would be suggested by the previous part of this note. There is a growing tendency on the part of some sections of the community to depart from scientific methods and to ask for a restoration of the systems of medicine which have had their day and which are utterly incapable of playing any important part in the progress of medical science. A study of these systems and a serious effort to discover what is of value in them is worthy of encouragement, but their reinstatement as accepted parts of the machinery of medical research and medical relief should not be undertaken until a thorough investigation has been made into their teachings and methods. Scientific medicine publishes its discoveries to the whole world, these are open to the fullest investigation and are not accepted until they have satisfied competent and critical investigators. An earnest search is being made to discover from every possible source better methods of diagnosis, treatment and prevention. The claims of every system of medicine must be subjected to a similar scrutiny before they can be accepted by reasoning human beings.

We must break once for all with the idea that scientific medicine is one of several competing systems, the use of the word "allopathic" to designate those who aim at the practice of scientific medicine is most objectionable. Medicine is rapidly becoming scientific and the part of it that remains unscientific is just as worthy of rejection as are the great masses of traditional beliefs which are held by the practitioners of the various systems of medicine.

There can only be one aim in scientific work, the discovery of truth and the improvement of existing imperfect methods. This aim can best be attained by following on the lines which have proved successful in all branches of knowledge, viz., those of accurate observation of facts and the formation of conclusions which are justified by the facts.

Medical education in some parts of India is passing through a critical period. The General Council of Medical Education and Registration has demanded that the medical examinations of the Universities of India should be inspected as a condition of continued recognition of the degrees; in Bengal this action has been challenged, with the result that the Medical Council no longer recognises the degrees of the Calcutta University.

The position of medical research in India is not so bad as might have been anticipated when the Inchcape axe descended on the Indian Medical Research Fund Association. What has happened is that the greatly needed expansion of medical research has been stopped, and the recruitment and training of the research workers of the future has been greatly hampered. Many of the most experienced research workers are retiring and suitable men who are not forthcoming to fill their places. The loss of the services of Lt.-Col. McCarrison to India was due to the curtailment of the funds of the Indian Research Fund Association. It is most important that systematic research into the dietaries of the people of India should be continued, and there is no worker who is more competent in this line than McCarrison. Those who will inevitably suffer are the people of India; it is in their interests that medical research should be organised and placed on a sound financial basis.

Another great need of India is the reorganisation of the medical forces which are at present engaged in medical relief and disease prevention. Nobody can for a moment argue that the existing medical personnel forms an army with an organisation which promotes the greatest efficiency. The members of the medical forces constitute excellent material, but they are employed to a great extent as isolated units working as best they can, and no adequate steps are taken to ensure that their efficiency is kept up to a high standard or that their efforts are co-ordinated. Praiseworthy experiments are being carried out in the formation of organisations for disease prevention and medical relief in certain small areas in India. It is essential that these should be thoroughly tested and that other experiments on well thought out lines should be made. Those methods which are found to be most effective should be extended on a definite plan. It is also essential that all medical men who are employed by Governments or by local bodies should receive periodical courses of training in modern methods of diagnosis, treatment and prevention of disease. These courses should be directed so as to bring up to date the knowledge of those who attend, with special reference to the duties which they have to perform.

The education of school children and students in the elementary laws of health should form a part of the curriculum of every school and college of India and a scheme should be worked out by which this education can be made effective. Even if no addition were made to the medical or educational budgets, it is quite possible to devise plans by which medical aid and disease prevention could be made vastly more effective than is the case at present.

Another point which cannot be lost sight of is that the economic condition of the people must be improved by encouraging more efficient methods of agriculture and industry, and that the general

education of the country should be directed towards fitting the children for their future careers.

The very important resolution which was unanimously carried at both of the conferences of medical research workers will doubtless bring about action by Government. This resolution called attention to the deplorable state of health and physical efficiency which prevails in India at present. It emphasised the great complexity of the problem of dealing with these and insisted on the urgent need for the appointment of a commission to examine the whole question. The appointment of such a commission would be likely to result in the formation of a definite programme and in the reorganisation of the forces which are engaged in the effort to better the physical and economic condition of India. Every one who has the good of India at heart ought to do his part in urging on Government the necessity for a serious enquiry into the real troubles of India. If the year 1925 should see the commencement of an investigation into the causes of ill-health and economic depression which exist in India, the outlook for the future is likely to become brighter than it has ever been in the past.

We have witnessed enormous advances in our knowledge of the prevention and cure of disease; what is most urgently needed now is the working out and putting into practice of a comprehensive scheme for the practical application of this valuable fund of knowledge.

Major Knowles and a distinguished band of collaborators have once again placed the whole medical profession of India under an obligation for the detailed summary of the advances which have been made throughout the past year in India, published as a supplement to this issue. It is only by reading such a review that one realises the greatness of the work which is being done. A spirit of co-operation is manifesting itself to an increasing degree, but we are far from the ideal of securing the help of every intelligent practitioner in India in the work of research. This is perhaps to some extent the fault of research workers themselves; they might do more to enlist the co-operation of the practitioners of India in their work and to dispel the too prevalent idea that research is the duty of a special priesthood of the profession. There ought to be a closer bond between research workers and general practitioners.

In this connection it is interesting to note that most of the really great discoveries of the past in India have been made by men who had little special training in research methods. Men like Sir Ronald Ross and Sir Leonard Rogers felt the inward impulse to research and no difficulties were sufficient to prevent them from following up their inspirations. Methods of research are becoming more and more specialised, but at the same time the facilities for training are vastly better now than they were ten years ago,

and apart from the highly technical forms of research there are many problems which could be solved by the co-operation of untrained workers, granted that they were given lines on which to make observations of the cases which come under their notice.

The *Indian Medical Gazette* has always done its best to encourage the spirit of enquiry among the men who hold the outposts in the profession; it is anxious to receive more papers which deal with clinical observations which will be of help to the general practitioner. The preponderance of papers which are published by trained workers is due chiefly to the fact that the general practitioners are holding back and are not sending contributions in such numbers as could be desired.

The limitations of space which have to be observed are hard facts, but the *Gazette* will do its best to find room for articles of a useful clinical type, and for practical suggestions for the improvement of our methods of dealing with the problems which are encountered by the general practitioner.

J. W. D. MEGAW.

Reviews.

BULLETIN NO. X OF THE INTERNATIONAL ASSOCIATION OF MEDICAL MUSEUMS AND JOURNAL OF TECHNICAL METHODS. New York: Paul B. Hoeber, Inc., 1924. Pp. 165. Price \$3.00.

THIS annual bulletin has recently appeared and is, as usual, replete with valuable articles and notes. It has added to its title *and Journal of Technical Methods* and this addition has been signalled by *Abstracts of Current Literature* dealing with macroscopic, microscopic, and bacteriological technique.

This section provides a very valuable supplement to the various manuals on technique which exist in all laboratory libraries, and is a welcome addition to the bulletin, previous issues of which were already highly appreciated.

Special articles in this bulletin deal with museum classification, and a method for the staining of many paraffin sections at one time, while there are several shorter original ones on museum and laboratory technique.

Laboratory workers and especially those concerned with museums are sure to find these bulletins of great assistance to them in the performance of their routine.

Curators of museums will also appreciate the Bureau for international exchange of material.

G. S.

HOME SEWAGE DISPOSAL.—By W. A. Hardenbergh, Major, Sanitary Corps, O.R.C. 82 Illustrations. Published by J. B. Lippincott Company, London. Obtainable from Messrs. Butterworth and Co., Ltd., 6, Hastings Street, Calcutta. Price 12s. net. Pp. 274.

THE problem of the disposal of human excretal matter is fairly easily stated; it consists in the conversion of a mixture which is offensive, putrescible, unstable and dangerous into something which is inoffensive, non-putrescible, stable, and safe; by means which shall at once be as free from nuisance and as economical as possible. The problem has existed since man's intelligence began to dominate his surroundings. The part most difficult of solution is the economical one, and

where the community of man is poorest, there are conditions worst and there will the insanitary symbiosis known as disease longer on longest. The present book is an attempt to cater for those who cannot obtain or afford the luxury of a proper water carriage system, but whose sanitary instincts and economic conditions are sufficiently advanced to imply willingness to expend a certain amount of their own money, time and attention on excretal disposal.

The book is mainly intended for rural districts in the United States; isolated houses, small communities and institutions being especially considered.

In India the service privy with subsequent collection and trenching of night soil is almost universal in most small towns, while in isolated villages excretal disposal is elementary, the Mosaic injunctions even not being observed.

The septic tank latrine and modifications like the aqua privy have been essentially Indian contributions to the problem.

Mr. Hardenbergh, who is Director of Rural Sanitation in Jefferson (Alabama), has been at great pains to produce an essentially practical book. Pit privies, box and can (commode), septic closets, Imhoff tanks, concrete tanks, chemical commodes, are all fully described and discussed, constructional details are given in full and illustrated by numerous excellent diagrams.

Most of these, we are afraid, would be beyond the means and capacity of Indian villages, but for schools and institutions the detailed plans and instructions are excellent. A description of the "deep pit latrine" which did such excellent service during the war practically everywhere, might with advantage have been included. We have not seen the "chemical toilet" used or suggested in India. In this the box contains a solution of caustic soda which sterilises and dissolves the excreta and will last a considerable time without attention.

The author is sanguine that the average householder could make his own "concrete vault" from the instructions given; perhaps he could in America, but we do not see the average Indian householder sawing his "lumber" to make "forms" into which he will pour his concrete correctly mixed by himself in the proper proportions of sand, cement and gravel. The directions given for the subsoil disposal of effluents are very clearly given with full details and illustrations of the methods of laying pipes and of filling in the filter trenches. We are of opinion that the book will be of very great value to all workers in public health and conservancy matters, both engineers and medical men. We read the book with great interest and profit.

MINOR SURGERY AND BANDAGING.—By Gwynne William, M.S., F.R.C.S., Surgeon, University College Hospital. 18th edition. Pp. 423, with 239 illustrations. London: J. & A. Churchill, 1924. Price 10s. 6d. net.

A book which has attained to the hoary antiquity of Heath's "Minor Surgery," to give this book its former title, has no need of the help of the reviewer to increase its popularity. First published in 1861, it has been revised every four years or so, and has now reached its eighteenth edition. It was the first of the house surgeon's manuals and it has never been surpassed for completeness, conciseness and accuracy. It is a book which the experienced surgeon may well make use of to refresh his memory when taking classes in practical surgery. The technique of aseptic surgery has not altered materially of recent years, and the treatment of infected wounds is much where it was left by the war. Kanavel's work on septic infections of the hand and his figures have been incorporated in an excellent section, which we welcome because the condition is so common and the new methods described are likely to give much improved results. The treatment of fractures by non-operative methods is dealt with in accordance with the

most modern ideas and we are glad to see the illustrations of the old splints superseded by those of modern ones. Delbet's method of treating fractures of the tibia and fibula has been included, a short section on the methods of employing skeletal traction has been given, and more emphasis has been laid on the use of plaster of Paris splints. We need hardly add that we recommend the book as heartily as ever, as a sound guide for house officers and junior practitioners at a very modest price.

FUNDAMENTAL PRINCIPLES IN TREATMENT.

By Dr. Harry Campbell, M.D., B.S., F.R.C.P. (Lond.). London: Baillière, Tindall & Cox, 1924. Pp. viii plus 477. Price 10s. 6d.

DR. HARRY CAMPBELL is one of the most attractive and readable authors whom we know; and this little volume is altogether admirable. In it is garnered together the accumulated wisdom of many years of medical practice, of teaching students, and of experience. If Osler's "Aequanimitas" is—as it deserves to be—a classic, this volume is a worthy second; for it deals with the physician and patient in their every individual and professional aspect. Did space but permit, we should like to quote from it wholesale. The subjects dealt with cover so wide and varied a range, however, that this is almost impossible.

On the education of the physician Dr. Campbell writes well; what is wanted is a sound general knowledge of the elements of his science and art, rather than braininess and specialism. Specialism indeed is now so elaborated that we read that in America, dental surgery is being split up into sections, one man devoting a lifetime of work to extraction, another to fillings, a third to dentures. He relates how a would-be aspirant, anxious to become a specialist on skin diseases, consulted one who had already attained to considerable fame in that line. The latter's definition of a skin specialist was one, the sound of whose name in any club would make all of its members involuntarily scratch themselves. The true teacher, he writes, should first learn the lesson of his own ignorance; once achieve that and the rest is easy; he will begin both to learn and to teach.

The physician's personality is next considered. He must have an iron constitution; the men who carry off the world's best prizes are those who maintain a high level of physical and mental health. Also sympathy and geniality are qualifications called for; tact, also, and business-like methods. Self-confidence is an invaluable asset, and the wisest physician is he who knows when to be silent; even a little humbug is useful, patients like it, and it is sometimes justifiable in the patient's interest. An old, but still amusing story here re-told is that of a famous physician who had prescribed grapes for a patient just before leaving the house. A servant was sent after him to ask for further particulars. The great man pondered deeply. Ten, and not more, he said, might be taken; but they must be white grapes and not black, and the pips should on no account be swallowed.

An admirable essay is that on thoroughness in examination of the patient. We all know the story of the visiting physician who enquired one morning of his house-physician how his patients were. "All doing well, Sir," replied the house man, "except the malingering, who died last night." A diagnosis of functional disease may sometimes be impossible to avoid, but it should not be given lightly.

Of consultations and consultants, Dr. Campbell writes very well. The worst type of "consultant" is the one who sees the patient independently, and subsequently tries to steal the case from the general practitioner in charge. Here the correct ethics of medical etiquette are rightly insisted on. Of quackery, he writes delightfully; instances given are the wife of an English ambassador energetically supporting the pretensions of one of the worst of cancer quacks; a distinguished writer of fiction who perished under the administrations of 'Christian Science'; an English Prime Minister who

declared the benefits of vaccination to be an open question. That quackery flourishes in almost every land is to be largely attributed to the exceedingly lax attitude of the lay press towards it; newspapers will accept almost any nostrum for advertisement, as long as it pays well.

The *vis medicatrix naturæ* being the physician's greatest friend and ally, we have to consider the relationship of instinct, reason and habits to treatment; most cases of chronic illness, indeed, shew a certain amount of adaptation to morbid conditions. The surgeon is in the fortunate position of knowing what is to be done and attempting to do it. With the physician the case is otherwise; he works partly in the dark, and his practice of medicine is still an admixture of what is rational and what is still empirical. Some given disease is perhaps amenable to treatment by several different means, and at present therapeutics is in a thoroughly unsettled state; "of all the inexact sciences therapeutics is probably at the present day the most inexact..... and this from the inherent difficulties which it presents." The result is that a wise attitude of conservatism is what is desirable; here and there a physician may go in for the latest fad and the newest "system," but he would be far better advised to hold to what is proved; "let him have fads, but let them be as broad-based as medicine itself." There are grape-cures, water-cures, raw-meat-cures, sunlight-cures, the mud-cure and a host of others; the mistake is to suppose that any one is universally applicable. In brief each patient is an individual problem, requiring individual study.

Following upon such introductory matter, come sections upon general principles, the plasma, sera and vaccines, septic foci, endoerines and enzymes, followed by six chapters on psycho-therapy. In this last section there is much interesting reading; the psycho-analysts, we read, have themselves largely to blame for the opposition which they have encountered; "much of their literature is frankly coarse. Admitting that to the pure all things are pure, there are ways and ways of presenting unpleasant truths." The influence of the emotions on health is profound; in the remote past ancestral man lived a life of excitement interrupted by intervals of boredom; to-day life is at a far duller level, the chief need is that for a livelihood, routine has replaced the chase, and matrimony, sexual adventures. But the inherent love of excitement is still inbred in modern man, as witness his love of gambling in any form. Hence the evil of melancholy surroundings in a sick room; the need to keep the patient, if fit for it, amused and entertained; "what would a really tame and harmless man, with no devil in him, be like?"

Sections follow on fresh air, ventilation, housing and clothing, exercise and diet. Modern diets of to-day, the author claims, are quite unnatural. When primitive man had to hunt for and capture his food, his diet was correct; to-day it is overburdened with carbohydrates and saccharides. "Cow's milk has been an enemy rather than a friend to British children in that it has favoured pap-feeding and driven hecatombs of them to a premature grave from tuberculosis." Sections follow on mastication, the care of the teeth, selection of diets, and physical nurture, and the book closes with an admirable set of aphorisms entitled "some important therapeutic truths," from which we cull the following:—"Keep well. Cultivate tranquillity and geniality. Be business-like. Keep an open mind. In examining a patient, be thorough; don't be hurried. Be consistent; be authoritative; give precise directions to nurse and patients; never blurt out such terms as cancer and cataract to a patient; when you find you have not your patient's full confidence, retire from the case. Common sense is a valuable asset in treatment. Avoid fussy interference with Nature."

We trust that we have done something to convey to the reader the charm and interest of Dr. Campbell's book; personally we found it entirely enjoyable and instructive.

CLINICAL METHODS.—By R. Hutchison, M.D., F.R.C.P., and H. Rainy, M.D., F.R.C.P. (Edin.), F.R.S.E. Eighth edition. London: Cassell & Co., Ltd., 1924. Pp. 688, 16 colour plates and numerous text illustrations. Price 12s. 6d. net.

THIS medical classic is not merely an aid, it is an essential to every medical student, and also a standard work of reference for the general practitioner. The eighth edition has been completely revised. Of the many additions made, the chief are sections on the fractional test-meal, Van den Burgh's test, the tests for estimation of sugar and of urea in the blood, and the urea-concentration test. The section on cardiographic methods has been entirely re-written with the aid of Dr. John Parkinson, and also re-illustrated. Many other new illustrations are included, whilst the colour plates are of a very high standard. Especially valuable are the colour plates of the appearances of the blood in different blood diseases and the anæmias, whilst the one of malarial parasites is both good and accurate. A new and useful plate is No. X, on the spectra of hæmoglobin and its derivatives. The figures of the helminthic ova, however, might be improved upon.

The new edition is certain of a wide circulation and we trust that it will receive a very warm welcome in India. It is very much up-to-date, and fills a niche in the medical student's or practitioner's library which no other book so exactly does; combining, as it does, bedside and clinical examination with laboratory and biochemical tests.

A MANUAL OF THE PRACTICE OF MEDICINE, PREPARED SPECIALLY FOR STUDENTS. By A. A. Stevens, A.M., M.D. 11th edition. London and Philadelphia: W. B. Saunders Company, Ltd., 1923. Pp. 645. Price 18s. net.

THE manual of medicine which has run to the eleventh edition has proved its popularity. It deals with all the diseases described in an elementary way. It is written in a very plain style and the arrangement is excellent. The pages dealing with tropical diseases, however, require further revision. With regard to kala-azar the statement "the mortality is said to range between 75 and 95 per cent." was only true before the antimony days. In connection with malaria "males are more often attacked than females" is apparently based on statistics of hospital-coming patients. "The pulse is accelerated in dengue fever" does not conform to the usual finding, which is just the reverse during the course of the disease. The page on beriberi describes the disease as seen in China and there is no mention of the epidemic dropsy form of beriberi which is very common in India. So far as other diseases are concerned the book is very useful and in fact it is a dictionary of medicine dealing with all the diseases, including the common diseases of the skin, which will be of great help to students preparing for examination, as well as for the general practitioner.

THE TREATMENT OF COMMON DISORDERS OF DIGESTION. By John L. Kantor, Ph.D., M.D. Illustrated. St. Louis: C. V. Mosby Co., 1924. Price \$4.75. Pp. 245.

THIS volume is intended to serve as a guide in the treatment of those forms of digestive disorders most commonly met with in the practice of medicine.

It is profusely illustrated with drawings and x-ray photographs and a start in treatment is made from the objective conditions thus revealed. This is a new departure, but it is obviously more sound than the empirical methods hitherto employed in these cases.

The book is written entirely from the practical point of view. The first chapter is devoted to general principles and methods, and deals with such subjects as general management, diet, gastric lavage, intestinal intubation, etc. Subsequent chapters deal with the question of ptosis, gastric irrigation, gastric and duodenal ulcer, delayed gastric emptying, constipation, achylia gastrica, gall bladder disease, diarrhoeas, and headaches associated with indigestion.

The style is clear and precise and the book is notably free from the verbiages of many American text-books. The paper, printing, and reproductions of skiagrams are worthy of the best traditions of the C. V. Mosby Co. It is essentially a work for the general practitioner, and we have no hesitation in recommending it as one of the best of its kind.

PEDIATRICS. By various authors. Edited by Isaac A. Abt, M.D. Complete in eight volumes. Vol. III. Pp. 1051, illustrations 223. London and Philadelphia: W. B. Saunders Co., Ltd. Price, Cloth 45s. net.

THIS volume maintains the same high standard of excellence as its two predecessors. It is essentially a book for the consultant. For the average general practitioner it is quite impossible to follow the standards laid down by the experts who contribute to the volume.

"The best is the enemy of the good," and what is needed for the practitioner in India is a clear statement of the best methods of diagnosis and treatment which it is practicable for him to carry out, rather than an account of the methods which are followed by highly specialised practitioners working under the conditions that prevail in London or New York. It does not help the Indian physician to tell him that the only treatment of hypertrophic stenosis of the pylorus is surgical; too often he cannot get a surgeon to operate, even if the parents of the infant are prepared to consider the question of operation. The statement that cases which are treated medically nearly always die will not be accepted by those who have experience of the medical treatment of such cases.

The author who deals with appendicitis in children is quite right in saying that there is no non-surgical treatment of the disease that can justify itself, but it is unfortunately true that cases of appendicitis in India often have to be treated medically, and it is also true that in such cases the mortality can be greatly reduced by skilful treatment.

The authors of this volume are American, with the exception of Pirquet who writes on the "nem" system of nutrition.

To all who have the time and the inclination to make themselves familiar with the modern advances in the management of children's diseases we can strongly recommend the purchase of Abt's "Pediatrics."

LIPPINCOTT'S QUICK REFERENCE BOOK FOR MEDICINE AND SURGERY. By George E. Rehberger, A.B., M.D., 4th edition. Philadelphia and London: J. B. Lippincott Co.

THE third edition of this book was reviewed so recently (April 1924) that it is not necessary to give a fresh description. The new edition has been brought up to date. It is very attractive and will be much appreciated by the general practitioner for whom it is specially intended.

The fact that the book has gone into a fourth edition since 1920 speaks for the great popularity of the work.

PHYSIOLOGICAL PRINCIPLES IN TREATMENT. By W. Langdon Brown, M.A., M.D., F.R.C.P. 5th edition. London: Baillière, Tindall & Cox, 1924. Price 10s. 6d. net. Pp. 511.

THAT this well known little book has reached its fifth edition in the short space of sixteen years is sufficient proof of its popularity. The application of physiological principles to the practice of medicine becomes more and more a practical necessity. The divorce of physiological teaching from the practice of medicine is now only insisted on by the old-fashioned empiricist. This little volume aims at creating that physiological outlook in medicine which the modern physician must possess.

Two new chapters have been added to the present volume, one on the liver and the other on asthma. There are also new sections on fractional test meals, insulin, uræmia and dyspnoea. These are all written in the author's inimitable style and form an important

addition to our conception of disease and methods of investigation and treatment which every up to date physician should know.

THE PROPHYLAXIS OF DIPHTHERIA BY THE DETERMINATION OF SUSCEPTIBLES AND THEIR ACTIVE ARTIFICIAL IMMUNISATION IN THE UNITED STATES. By Dr. Louis Van Boeckel, Director of the Laboratory of the Belgian Public Health Department. For the Health Organisation of the League of Nations. Geneva, 1924. Price 2s. 6d.

THE health organisation of the League of Nations is in a position of being able to accomplish work of importance to the signatory countries. Its funds can apparently be expended in investigating procedures in one country likely to be of use elsewhere, and health matters of international importance will more probably receive wider attention, trial and application than hitherto. With the discovery of the causal organism and method of cure, hopes of total elimination of a disease would seem to be reasonable. In the case of diphtheria this had not proved to be the case, and other aspects of the problem required intimate study before further progress in actual prevention became possible. The discovery of the bacillus in 1884 and of the antitoxin in 1890 have led, it is true, to a diminution in the case death rate by six-sevenths, but diphtheria morbidity in the United States has been reduced only by one-third and the case death rate still amounts to 8 per cent.

Carriers of virulent bacilli are numerous, their detection tedious and difficult, cases of diphtheria are not diagnosed early, antitoxin is given too late, sometimes insufficiently and sometimes not at all through anaphylactic fears.....these are some of the causes which led to the study of new methods of prophylaxis. The intensive study of the application of the Schick test of susceptibility and the immunisation of susceptible individuals by toxin-antitoxin mixture by enthusiastic workers in America, and the importance of the possibilities claimed led to a visit by a representative of the League of Nations to America, and the present report embodies Dr. Boeckel's observation and opinions.

It is an up-to-date critical résumé of the theories, principles and methods of application and results of these measures. A very complete bibliography is given.

Between 1911 and 1913 Schick demonstrated not only that the presence in the blood of a human being of 1/30th part of an antitoxin unit per c.c. rendered the subject refractory to diphtheria intoxication, but also that this quantity neutralized 1/50th part of a minimum lethal dose of toxin injected into the skin, so that no reaction occurred. If a human being reacts locally to the intradermal injection of 1/50th M.L.D. of toxin, his blood naturally contains less than 1/30th of an antitoxin unit per c.c. If the blood contains more than this, there is no reaction, the subject is immune. Park concludes that we are entitled to believe that a person with sufficient natural antitoxin to give a negative Schick reaction cannot contract diphtheria toxæmia or serious infection; further he thinks that apparent diphtheria infections in cases giving a negative Schick reaction are really streptococcal in nature. The preparation of the toxin best suited for the application of the test is discussed. Outfits are put up by Parke Davis & Co. and other well-known American firms and these outfits must conform to U. S. Public Health Service Regulations. Very full details of the technique of injection are given. The various types of reaction are also given, but the value of this part would have been enhanced by illustrations. Dr. Boeckel is of opinion that the value of the Schick test has been conclusively proved. Among 57,000 New York school children who gave a negative Schick reaction, Park noted only 5 cases of clinical diphtheria whereas 56 cases occurred among 90,000 other children, examined for comparison. As evidenced by the Schick test, susceptibility to diphtheria is slight during the first 6 months of life, becomes more pronounced between 6 months and 1 year, at which age it is highest in over 90 per cent. of children. It continues

to be strong until the age of 3, and diminishes progressively with age. Epidemiology has noted these facts previously, diphtheria occurring rarely at the beginning of life and in mature age, but frequently in children and rarely in adolescents and adults. Girls are more susceptible than boys. Well-to-do classes are more susceptible than those of thickly populated areas; similarly rural areas exhibit more susceptibility than towns.

Natural immunity once established is never lost, even after serious and debilitating disease. Natural contact with the diphtheria bacillus would seem to account for the immunity naturally acquired.

Most healthy carriers give a negative reaction, but a considerable proportion give a positive reaction. In the latter there is probably a local epithelium immunity.

After an attack of diphtheria, the Schick reaction does not always become negative. The earlier and more energetic the antiserotherapeutic measures, the less likely is the reaction to become negative. It would appear that early and complete neutralization of toxin destroys the stimulus necessary to create immunity. The Schick reaction has shown that artificial passive immunity given by anti-diphtheritic serum cannot be indefinitely prolonged by further injections; the more numerous the injections, the shorter becomes the period of additional immunity. The body tissues become educated to deal quickly with the foreign proteins injected. Several weeks is the limit of prophylaxis thus possible by passive immunity.

Active Artificial Anti-Diphtherial Immunization.—Attempts at active immunization of human beings by injections of diphtheritic toxin proved impracticable owing to violent local reactions and sometimes paralysis. A mixture of toxin and antitoxin, first in animals and later in human beings, was found to produce active immunization without local reaction. The immunity was produced comparatively slowly. Extended experiments have shown that the mixture should be carefully prepared and standardised so that untoward results may not occur. Well aged toxins and antitoxins are used. The L + dose of toxin is determined by titration with standard antitoxin and is the amount of toxin which, mixed with 1 unit of antitoxin, will kill a standard guinea-pig in 4 days. For immunization the toxin should be strong enough to contain 3 L + doses in less than 1 c.c. To the toxin mixture is added antitoxin and normal saline so that 3 c.c. of the resultant mixture given to guinea-pigs leads to the survival of these for more than 4 days.

The mixture is then filtered and kept until half the guinea-pigs injected with 5 c.c. survive for 10 days and only die slowly with paralytic symptoms. The product is then ready for use. The dose is 3 hypodermic inoculations of 1 c.c. each at intervals of 8 to 15 days; for children half the amount. Fractional inoculation is advised to those reacting strongly to foreign protein. The manner in which the mixture produces immunity is not known. Disintegration in the system would appear to be one explanation but does not explain all the facts.

American statistics appear to place beyond doubt the efficiency of prophylaxis of the measure. 500,000 diphtheria vaccinations have been carried out. The Schick reaction later becomes negative in cases previously positive. In 33,000 cases giving a positive Schick reaction, and immunised, only 9 cases of diphtheria occurred; in 90,000 used as controls 56 cases occurred. Immunity as shown by a negative Schick test develops in about six months, and lasts for life. No harmful effects have been observed. Between 6 and 12 months is the best age for active immunization.

Passive artificial immunization with antitoxin serum impedes active artificial immunization. Park recommends active immunization as a general measure of prophylaxis. Children between 6 and 12 months mostly give a positive Schick reaction and therefore at this age the test is unnecessary; universal active immunization carried out at this age period would definitely reduce

diphtheria mortality. After 3 years of age only susceptibles, as determined by the Schick test, need be immunised. These procedures have been taken up with American enthusiasm. It is evident that the toxin-antitoxin mixtures must be very carefully and very expertly prepared. The author is of opinion, however, that the older continent of Europe will be loth to accept a campaign on the same vigorous lines. There is no doubt, however, that where diphtheria is prevalent in endemic form the health services should apply these methods if they do not wish to be accused of neglecting to employ every possible means to combat the disease. The method was used successfully in a school in Shillong and it is as an institutional measure that in India, at any rate, these methods would seem to offer greatest scope.

The principles are capable of application in other diseases and already we have a "Dick" test for susceptibility in scarlet fever where a hæmolytic streptococcus is used.

A. D. S.

ORGANOTHERAPY IN GENERAL PRACTICE. Published by G. W. Carrick Co., New York. Pp. 253. Price \$2.00.

In these days of rapid advance in practical medicine much attention is being given to the study of different diseases from the point of view of the internal secretions and many a dark corner in the field of clinical diagnosis has been illumined by the application of the results of investigations into the functions of endocrine glands. It is no wonder, therefore, that a practising physician should be considered as being not up-to-date if he is lacking in knowledge of this most important branch of physiology. Recent researches in many diseases, especially some of the tropical diseases, tend to show that not a few of them have endocrine deficiency as their origin and their treatment will be much simplified if it is based on the correct recognition of the causal factor.

We welcome the publication of this book which deals with the entire field of organotherapy in a very practical and concise form. It is sure to prove very helpful to all medical men who want to adopt the modern principles of treatment in their practice. The chapters on the thyroid, pituitary, adrenals, sex glands, etc., are ably written and will amply repay perusal.

At the end of the book there is a complete and useful list of the organotherapeutic products of Messrs. G. W. Carrick Co. with their overseas distributors.

INTRODUCTION TO THE HISTOLOGY AND HISTOPATHOLOGY OF THE NERVOUS SYSTEM. By Dr. Paul Schroder. Translated from the second revised German edition by Baldwin Lucke, M.D., and Morton McCutcheon, M.D., of the University of Pennsylvania. London: J. B. Lippincott Co. Price 15s. net. Pp. 161. Obtainable from Messrs. Butterworth & Co. (India), Ltd., Post Box 251, Calcutta.

It is difficult to see what useful purpose this volume serves. The author describes it as "lectures introductory to the demonstration of microscopic preparations on the projection apparatus." It is not a textbook or a reference book. The illustrations are not helpful.

As a class book for students commencing a study of the histology and histopathology of the nervous system, it no doubt has its uses.

It is in the author's words "an introduction for those who wish to become familiar with the subject," and is designed as a stimulus to further independent investigations.

The style is lucid but the information given is not always complete, e.g., on page 91 the author writes "The nerve cells are highly differentiated elements; this fact may account for their inability to proliferate," whereas the fact is that nerve cells do not possess a centrosome, which accounts for their inability to undergo cell division.

THE CLINICAL EXAMINATION OF THE NERVOUS SYSTEM. By G. H. Monrad-Krohn, M.D., M.R.C.P., M.R.C.S., with a foreword by T. Grainger Stewart, M.D., F.R.C.P. London: H. K. Lewis & Co., Ltd., 1923. Price 6s. net. Pp. 148.

WE have no hesitation in saying that this is the best six-shilling-worth in the whole range of medical literature. Its 164 pages are packed with clinical facts and tests, by the appreciation of which even the busy practitioner will be able to diagnose many obscure and otherwise puzzling nervous conditions. In a foreword Dr. Grainger Stewart writes: "Dr. Monrad-Krohn has shown his appreciation of the true needs of the neurologist and psychiatrist and has not confined his book to the purely neurological aspect of nervous disease but includes an outline of the examination of the mental state of the patient."

Dr. Stewart further points out that Dr. Monrad-Krohn is a member of the Royal College of Physicians, London, and so is well versed in the methods of the British School. As a Norwegian he has studied the subject in other countries and is thus able to present a scheme of examination of the nervous system based on a wide range of personal experience.

This is a little book which should be on the desk of every practitioner of medicine.

NEUROLOGIC DIAGNOSIS. By Loyal Edward Davis, M.S., M.D., Assistant Professor of Surgery, North Western University Medical School. London and Philadelphia: W. B. Saunders Co., 1923. Price 10s. net. Pp. 173. Illustrated.

IN this volume, according to the author, an attempt has been made to present the subject of neurologic diagnosis from the view-point of correlating symptoms with known anatomical and physiological facts.

Sixty-two pages are devoted to the physiological and pathological variations in motility, gait, electrical reactions, reflexes, sensation, cranial nerves, aphasia, and disorders of speech, sympathetic nervous system and trophic disturbances. The treatment of the various subjects under the above heads is somewhat meagre and dogmatic, though on the whole correct.

The remaining pages, about 100, are taken up with illustrative cases, their discussion and diagnosis.

While in no sense a complete or even a comprehensive treatise on neurological diagnosis, it is a work which may be read with advantage by all who are interested in this subject.

CLINICAL STUDIES IN EPILEPSY. By Donald Fraser, M.D. Edinburgh: E. & S. Livingstone, 1924. Pp. 248. Price 7s. 6d. net. Postage 5d.

ALTHOUGH the author states in the preface that his book is not written for the expert or the laboratory physician, it contains a great deal that will be both interesting and suggestive to the professional psychiatrist. The clinical features of the book which will strike the reader as by far the most important are the case of a Mr. X and that of the author. The history of Mr. X has been kept by himself with painstaking accuracy and much insight for about thirty years. The clinical value of these remarkable observations is greatly increased by a report upon them from that amazing genius, Hughlings Jackson. In this connection we may be permitted to observe how entirely we support the author's contention that it is discreditable to British neurologists that the invaluable work of Hughlings Jackson should still lie buried in medical journals, whereby much of it is rendered inaccessible to the majority of the present generation of doctors. The author's own case is one of severe migraine which, to all who accept Hughlings Jackson's view of its nosology, must be classified as a sensory epilepsy. We are sorry to note that Dr. Fraser has nothing but scorn for the psycho-analytical conception of idiopathic epilepsy, and characterises the psychological interpretation evolved by Pierce Clark as a "grotesque fancy." The author's own hypothesis is that vaso-constriction is the initial movement in the epileptic seizure without which there would be no epilepsy

as we know it, although, he maintains, there must be other factors of causation besides the primary constriction of the blood vessels. There are a good many errata in the book, some of which are mentioned on a slip, but some others are not so indicated. For instance, the name of the town in Westphalia where there is a large epileptic colony should be spelt Bielefeld not Biehlfield. Dr. Fraser has a novel system of employing the definite article which sometimes renders the book tiresome. The index, as might be expected in a work by a British author, leaves much to be desired. Perhaps one day British authors, especially of scientific works, will employ Germans to compile their indices, or, better still, go to Germany and learn there how to do it.

THE NERVOUS PATIENT. By Millais Culpin, M.D. (Lond.), F.R.C.S. (Eng.). London: H. K. Lewis and Co., 1924. Pp. viii plus 305. Price 10s. 6d.

THIS is an interesting and well-written book. The author is lecturer on psycho-analysis to the London Hospital Medical College, and, whilst a follower of Freud, he refuses to accept the wholly sexual explanation of suppression and repression advocated by Freud. During the war the War Office was compelled at last to pay very serious attention to the psychoses, to shell-shock and the like, and finally set up a centre for training medical officers in psycho-therapy at Maghull, and with this the author was associated. Hence he brings to the composition of this book a wide knowledge of the subject, together with a wide experience as a surgeon. And the results are well balanced and are interesting reading.

He classified the psychoses into conversion hysteria, anxiety states, obsessional states and actual neurasthenia. Psycho-analysis has thriven largely upon the opposition which it has encountered; to-day it bears two meanings and serves two purposes; it provides a theory of psychopathology, which strives to explain the ætiology of the psychoses in intelligible terms, and it provides a method of treatment. The author differentiates between suppression, which concerns material and memories which have once been present in the conscious mind; and repression proper, which is purely unconscious, and results from a struggle for supremacy within the unconscious of incompatible tendencies. In brief we have mental conflict at every cerebral level; which "may express itself at the psychic level of the nervous system as an obsession or a phobia, and at the sensorimotor level as a paralysis, a tic, a contracture or an anæsthesia; while if it sinks deeper down to the visceral level, it may express itself as glycosuria, exophthalmic goitre or asthma," to quote Dr. Langdon Brown.

The value of psycho-analytical treatment is proved by its success, the author claims. We are accustomed to admit as permissible any mode of treatment which is successful; even the virtues or otherwise of "therapeutic lying" were discussed in the *Lancet* a few years. How it works is not certain, but it is certain that the practice of formal suggestion, with the patient in "a position of relaxation and a mental state approaching the hypnoidal, has successes. Suggestion therapy is often unconsciously used by every physician; if he were but trained to use it well and wisely his success would be greater as a healer of mental disorder.

From such an introduction, the author first analyses the minor psychosis, where he shews that such psychoses may be associated with physical causes and yet be independent of them in origin. Thus we have toxin theories, endocrine theories, blood-condition theories; according to Professor Swale Vincent "the continued and indiscriminate exploitation of the endocrine glands constitutes one of the worst forms of present-day quackery." That emotion has its bodily effects we all know; and here the author quotes the following delightful stanza from a hospital poet's *Ode to an Examination Candidate*:—

"Heed not the diuresis, that is but
The automatic signal of thy woe,"
and refers to mucous colitis, that "asthma of the colon," as being sometimes of emotional causation. Our

knowledge concerning the organic side of the minor psychoses is almost nil; hence psycho-analysis affords the best line of therapy.

Turning to hysteria, two main factors appear to be concerned in its aetiology; the loss of memory for experiences, the recollection of which is repugnant to the patient; and some motivation which is not within the patient's knowledge, and is not indeed always or often obvious to the observer. An account is then given of the bodily symptoms of hysteria and of the tests for the condition. Anxiety and obsessional states, the minor phobias in fact, tend to be concealed, until the patients are talked to frankly; often they are hidden under physical manifestations and completely overlooked. "The list of ailments in which a 'nervous' element exists is a long one; they are all of doubtful causation, and now that modern psychology can offer something to the understanding and treatment of them, the cases should be investigated from the point of psycho-pathology."

Ordinarily it is taught that functional disease is that in which no organic cause can be found; yet such a point of view is wrong; nervous disorder may accompany organic disease, it may even engender it; dismissal of a patient's trouble as "neurotic" does justice neither to the patient, nor to the science of medicine.

A chapter follows on practical instructions for the psycho-analytical examination of the patient, and then one on asthma and allied disorders. Both asthma and urticaria may in some patients be the equivalents of an anxiety attack; in fact we have here problems which involve both bio-chemical and psychological study. The epilepsy beginning in adolescence, the possibility of a psychogenic origin justifies an attempt at cure by analysis; in epilepsy associated with anxiety symptoms, the latter may be relieved by treatment, and some at least of the fits may prove to be hysterical; in cases where psychological examination demonstrates that the fits are hysterical or obsessional, the diagnosis of epilepsy must be put aside and psycho-therapy must be used." In gynaecological conditions the method has supreme value in the treatment of dysmenorrhoea, dyspareunia, and—above all—of the menopause. It is at least more promising than ovarian extract; "the amount of ovarian extract swallowed by women suffering from trouble at the menopause might be expected to lead to some definite appraisal of its value," writes the author, "but its use is still based upon hope."

The mental conditions and psychoses arising after trauma deserve far more careful study than they have yet received. Postural deformities and digestive and cardiac neuroses are often of psychic origin; "to persuade the owner of a protuberant abdomen to tuck in his belly, to throw out his chest and cock up his chin, is certainly a sounder procedure than to radiograph his intestinal tract after a bismuth meal and tell him that he is suffering from colonic stasis. Disordered action of the heart in the majority of cases is entirely of psycho-genetic origin," and should be treated as such.

In an additional chapter by Mr. W. S. Inman we have discussed eye symptoms of psychic origin; thus eye-strain is often of such origin; there is no definite relationship between the severity of the symptoms and the degree of refractive error; the wrong glasses may cure the patient, or the correct glasses may fail to cure. Often with regard to squint there is emotional instability. Left-handedness and stammering not infrequently accompany mental abnormality or psychoses.

In chapter 17, Dr. Stanford Read deals with the major psychoses as encountered in general practice, and here there is well outlined the rôle of the family physician as someone responsible, not only for the physical well-being of his patients, but for their mental health and for their mental and even spiritual advice as well as for the prescribing of drugs. Finally in chapter 18 we have outlined the general methods of treatment; and in

chapter 19 a most curious human document; a long letter written by a mental patient, for the authenticity of which the author vouches, and which conveys many lessons as to the inability of the ordinary and even specialist physician to deal with the mental case, and which is a document of curious and perhaps unique interest, almost the history of a lost soul, or at least of one who had tried many things of many physicians, and had failed to secure relief, and who was looking forward to the "seventh year" which perhaps would end it all.

Dr. Culpin's book is one which we would recommend to the attention of our readers. It is written from so broad a standpoint that it cannot fail to be of interest. Psycho-analysis appears to have a definite place in present-day therapy; but it would be better if the general practitioner exercised such an influence upon a basis of knowledge rather than of ignorance.

TRANSACTIONS OF THE AMERICAN PROCTOLOGIC SOCIETY, 1923. TWENTY-FOURTH ANNUAL SESSION. Edited by Maude E. Abbott, M.D., and Major James F. Coupal. New York: Paul B. Hoeber, Inc., 1924. Price \$3.00 net. Pp. 89.

We welcome the publication of these *Transactions* both for the summary of transatlantic progress in proctology with which they furnish us and for the reports of the breezy discussions on the papers. The speakers appear to know one another well enough to use the personal pronoun and to be very candid in their expression of their views, in refreshing contrast to the staid proceedings of British medical societies.

There is little that is new brought forward this year. Local anaesthesia is to the fore and appears to be steadily ousting general anaesthesia in the United States in this branch of surgery. Dr. Buie contributes a most interesting statistical summary of the Mayo Clinic observations on carcinoma of the rectum and pelvic colon, based on the records of 1,937 patients seen between 1910 and 1922. The figures show a steady rise in the percentage of operable cases to over 80 per cent. and a fall in operation mortality to under 10 per cent. Improvement in surgical technique and the increasing use of two-stage operations are mainly responsible for these results. That it is not to any great extent due to the patients being sent for operation earlier is shown by the sad fact that 18 per cent. of the cases operated on for carcinoma had had previous operations or treatment for hemorrhoids during the year previous to their admission to the clinic.

Dr. Clemons of Los Angeles brings forward an original treatment for rectal stricture by means of carbon dioxide snow, which many members expressed their intention of trying and of which we may expect to hear more next year.

ELEMENTARY HYGIENE. By Biharlal Lal Bhatla, M.Sc., F.Z.S., F.R.M.S., Lecturer in Zoology, Government College, Lahore; and Prem Nath Suri, M.B., B.S., Assistant Surgeon, King Edward Medical College, Lahore. Bombay and Calcutta: Longmans, Green & Co., 1923. Pp. 141. Price Rs. 1-8.

THIS small book has been written to meet the requirements of matriculation students in the Punjab and other parts of India, where the subject of elementary hygiene is studied along with a course of physiology. From a perusal of the book, we can say that the authors have carried out their object well. Facts are clearly stated and in the recommendations and advice given, full cognisance of Indian conditions is taken. The only criticism that we offer is that the arrangement and style are rather suggestive of the "examination." Some of the illustrations might be improved. A "loctometre" is hardly a correct description; the picture of "how to sleep" on page 115 does not suggest ideal conditions; the arrangements for air circulation are meagre and no mosquito net is suggested.

MATERNITY AND CHILD-WELFARE. A National Problem. By A. Lakshmanaswami Mudaliar, B.A., M.D., Assistant Superintendent, Government Maternity Hospital, Madras. With a foreword by Major A. J. H. Russell, M.A., M.D., D.P.H., I.M.S., Director of Public Health, Madras. Madras: Everyman's Publishers, Ltd., 1922. Pp. 149. Price Rs. 1-8. Obtainable from Everyman's Press, 1, McLean Street, George Town, Madras.

THE problem of the high infantile mortality in India is admittedly urgent; the appalling waste of human life that goes on in India cannot be right; the cold logic of the economist may state that a high infantile mortality is a necessary consequence of inflexible economic laws working on the human masses whose surplus vital energy produces but cannot maintain its numerous progeny. This may be so and it goes to the root of the problem; it is the economic conditions, the outlook and aspirations of the people that need looking to. It is one comfort to the practical sanitarian that his efforts against one particular disease are not limited but produce far-reaching results in other directions. Measures for the reduction of cholera lead to the reduction of other water-borne diseases, to habits of cleanliness and—what is most valuable—to a sense of civic responsibility both individual and collective, factors that go largely to the making of national character. Efforts to reduce the high infantile mortality in India hope not merely to preserve infant life, but to educate the masses in the eradication of dirty habits, in a cleaner mode of living, in parental responsibility, and to assist in that physical, moral and social uplift which is the line ordained by Nature for man's evolution.

Dr. Mudaliar in this book states the case for action clearly, vigorously and eloquently. It is specially intended for municipal bodies, which Dr. Mudaliar considers are the units most suited for starting work.

The layman on reading this book will not fail to be impressed by the descriptions of the conditions under which the average Indian mother, even in well-to-do families, undergoes her labour; he will find a clear account of what has been done in other countries, what is being done and what remains to be done in India; he will realise his own and his community's duties. Dr. Mudaliar's statements and arguments are intended for the lay public and therefore we would not too closely criticise some of his positive assertions. Australia requires population increase and grants £5 to every mother who gives birth to a child; but other countries are not in similar need. Not every one again views the low birth rate of France as a grave menace.

There are a few rather serious misprints; a typist from his political subconscience has advised "anternational care," and lovers of Dickens will be slightly shocked by the appearance of "Sarah Cramps."

For its purpose we thoroughly recommend the book.

NORMAL BONES AND JOINTS ROENTGENOLOGICALLY CONSIDERED. By Isidore Cohn, M.D., F.A.C.S. New York: Paul B. Hoeber, Inc., 1924. Price \$10.00. Pp. 218.

THIS book, the fourth volume of the *Annals of Roentgenology*, edited by Dr. James T. Case, is in reality an atlas of the bones and joints at different ages. The general scheme of composition is to begin with a review of the literature connected with the development and radiographic appearances of normal and injured joints, pointing out the fallacies which may arise from lack of knowledge of the normal appearances of the joints at different ages.

The type is large and clear, the reproduction of skiagrams leaves nothing to be desired. The omission of the Spanish and French translations provided in former editions is an advantage. Indeed the publishers are to be congratulated on having produced a book of unusual interest to the profession at large and a work of real utility to the roentgenologist and surgeon.

CLINICAL ASPECTS OF THE ELECTROCARDIOGRAM. By H. E. B. Pardee, M.D. With 56 Illustrations. New York: Paul B. Hoeber, Inc., 1924. Price \$4.00 net. Pp. 222.

IN this volume the author has collected all the facts and current knowledge of the electrocardiogram which are of clinical importance. Experimental and theoretical considerations are included when necessary to the elucidation of the subject in hand, and are given in as simple a form as possible.

The earlier chapters deal with the normal electrocardiogram and the physiology of the origin of the electrical waves. Alterations due to various abnormal conditions are then discussed. After this the author deals with the various disturbances in rate and rhythm of the heart and the concomitant variations in the electrocardiogram. A whole chapter is devoted to the clinical application of the facts deduced from this method of examination. In the final chapters the theory of the electrocardiogram and the mode of installation and use of the apparatus is described and discussed.

This book should prove of immense value to the practising physician, who has no time to acquire an expert knowledge of this subject, and who has occasionally to deal with heart cases where this method of investigation is essential to the correct appreciation of the condition of the heart muscle and its prognostic significance.

DIATHERMY AND ITS APPLICATION TO PNEUMONIA. By H. E. Stewart, M.D. New York: Paul B. Hoeber, Inc., 1923. Price \$3.00 net. Pp. 210.

THIS little book deals with the medical and surgical aspects of diathermy, with special reference to the treatment of pneumonia. The early chapters are devoted to general technique and a description of the various types of apparatus employed. The later chapters deal with actual cases and the results and effects of treatment.

The literary style is clear and easy, the illustrations profuse and well executed.

The author has made out a good case for the further trial of this form of treatment in pneumonia, and it is to be hoped that others will give it a trial in this disease, which is rightly described as one of the greatest scourges of the human race.

A TEXT-BOOK OF CHEMISTRY FOR NURSES. By Fredus N. Peters, A.M., Ph.D. Second Edition. St. Louis: C. V. Mosby Co., 1923. Price \$2.50. Pp. 302.

THIS little book does not pretend to be a complete exposition of the science of chemistry. It is written in simple language and the author, while being scientific and truthful, has aimed at avoiding the technical, so that the matter may be understood by all for whom it is meant.

The text is profusely illustrated. Other features are the introduction of questions on the subject matter at the end of each chapter, and a number of interesting tables at the end of the book.

We can only say that it is a volume well worth the careful perusal of the nursing sisterhood interested in chemistry.

TRANSACTIONS OF THE FIFTH BIENNIAL CONGRESS OF THE FAR EASTERN ASSOCIATION OF TROPICAL MEDICINE, SINGAPORE, 1923. Edited by the Hon'ble Dr. A. L. Hoops and Dr. J. W. Scharff. London: John Bale, Sons and Danielsson, Ltd., 1924. Pp. 974, 86 plates (2 coloured), and numerous charts in the text. Price 40s. net.

THIS excellently edited and printed volume constitutes a complete record of the Far Eastern Medical Congress held in Singapore in the autumn of 1923, which was attended by nearly a hundred delegates and representatives from all parts of the Far East. At the beginning of the volume there is a brief statement of the objects of the Association, followed by a list of delegates and representatives to the Congress, and members of the

Association. This is followed by the text of the address of welcome given by Sir Lawrence Guillemard, and the presidential address on "The Prevention of Disease in the Tropics" by Dr. A. L. Hoops. At the back of the book is a record of Council and business meetings, scientific meetings and social events, and excursions made by delegates to points of medical interest in the Federated Malay States. The remaining 900 pages contain the full text of 72 papers delivered at the Congress by men of renown from all parts of the Far East, with the discussions which followed them. The papers are grouped as follows: malaria 14, beriberi 7, ankylostomiasis 6, plague 4, leprosy 6, and miscellaneous, including one or more papers on nearly all the diseases of importance in the tropics, as well as some general papers, 35. It is impossible here to review, or even to name, the many valuable papers contained in the volume. Suffice it to say that many of them are of extraordinary interest, and constitute very important additions to our knowledge of the diseases which scourge the tropics. The editors are to be highly congratulated on the careful arrangement and attractive appearance of the book.

IMPERIAL SOCIAL HYGIENE CONGRESS. British Empire Exhibition, Wembley. May 12th to 16th, 1924. Organised by the National Council for Combating Venereal Diseases. 102, Dean Street, Oxford Street, London, W. 1. Pp. 286.

THE British Empire Exhibition, organised primarily to demonstrate the manufactures, products and resources of the Empire, brought together in England representatives from all parts of the British colonies and dependencies and gave an opportunity for the discussion of many subjects not necessarily considered in the exhibition. One such subject was what has been here called "social hygiene," otherwise known as the "social evil, the white slave traffic"; in plain language the moral and physical evils resulting from promiscuous sexual intercourse, the problems of venereal disease and prostitution. One may or may not approve of the publicity given to these subjects in medical, lay and what may be called the "Sunday" papers, but it is impossible to deny the benefit which has accrued to suffering humanity and to an innocent posterity from the dissemination of public knowledge of venereal diseases, their nature, dangers, and their cure.

Venereal disease has never been and indeed is now seldom correctly diagnosed and treated efficiently in its early stages by the general practitioner, and it is right that, in a matter so important to the public health, the State should make efficient diagnosis and treatment available for all. It is a notable fact that in England venereal disease stands conspicuous in being the one disease which an unqualified practitioner may not legally treat.

At the Conference, which lasted for five days, the subject appears to have been considered from every point of view. The present position in England is ably set out by Sir George Newman. The discovery of the causal organism of syphilis and later of a cure, and the development of the Wassermann reaction made it possible for diagnosis and treatment to be organised on lines which previously had been impossible. Public opinion became insistent that official measures should be taken, and in 1913 a Royal Commission was appointed and issued a report in 1916. Its recommendations form the basis of the present English organisation. Public Health Regulations made under the 1875 Public Health Act now give local authorities power to prepare schemes for the treatment of venereal disease and the Venereal Diseases' Act of 1917 provided for the suppression of quack advertisement and unqualified treatment. The schemes at present in force provide for (1) facilities for free laboratory diagnosis; (2) organisation of free treatment; and (3) public and professional education.

A full course of instruction is incumbent in every medical curriculum.

Compulsory notification and compulsory treatment are still subjects of discussion, while prophylaxis and methods of prevention by self-disinfection, being still subjects of controversy, have not been taken up by Government.

Dame Rachel Crowdy discusses the question of the international position with regard to prostitution and the suppression of the traffic in women and children. It is practically universally agreed that licensed houses should be forbidden; the inmates are practically slaves, all are sooner or later infected and as a result of the higher degree of promiscuity in licensed houses the danger of venereal contagion is greatly increased. The League of Nations is entrusted "with the general supervision and the execution of the agreements with regard to traffic in women and children." Prostitution as a domestic problem is therefore outside its sphere.

Sir Arthur Newsholme writes on "Some Aspects of Social Hygiene." He points out "the fundamental importance and sacredness of the family; that the guardianship of the germ plasm of the future, the passing on untainted of the inherent qualities of the family group is an essential duty of family life; that promiscuity, even in the absence of venereal disease, is the great enemy of family life."

Venereal disease is only a symptom of the trouble, which is deeper, more complex and difficult to understand and treat. We have not yet got behind Nature's purpose, if there is one. Multiply, multiply, she urges, with apparently no thought or provision for the consequences. To man alone has been given the gift of intelligence that he may try to understand the primal and ultimate intentions of Nature (should indeed these be). In a scholarly article Professor Mott writes on the "Psychology of Adolescence." The impelling influences developing in the young adolescent should on the one hand be kept from driving him into an abandonment to passion, and on the other from morbid introspection and wavering indecision. The normal adolescent may sow wild oats but will keep hold of the realities of life and remain a man of action. The first two types are exemplified in the impetuous Romeo and the melancholic Hamlet, while Henry V illustrates the third type. The adolescent female is absent from Shakespeare and is difficult of portrayal; the continental realists like Guy de Maupassant have successfully depicted her.

Other aspects of "social hygiene," e.g., "the general practitioner and the treatment of venereal disease," and "how to secure the maximum efficiency of a venereal disease clinic" are discussed fully, and a section is devoted to the consideration and description of the problem as it exists in various parts of the world under conditions naturally very varied. Representatives from India were insistent on the need for better education of the medical practitioner in India, and of the widespread incidence of venereal disease. Post-graduate education especially would seem to be necessary.

The book is issued by the National Council for Combating Venereal Diseases; and perhaps will be sent on application to those interested, as no price is given.

CORRIGENDUM.

IN our issue for last October, in the review of Dr. Wansley Bayly's book "Venereal Disease, Its Prevention, Symptoms and Treatment," second edition, on page 523; for "Messrs. William Heinemann," please read "Messrs. J. & A. Churchill," who are the publishers. The information that the book is obtainable from Messrs. Butterworth & Co., Calcutta, is correct.

Annual Reports.

ANNUAL PUBLIC HEALTH REPORT OF THE PROVINCE OF BIHAR AND ORISSA FOR THE YEAR 1923. BY LT.-COL. W. C. ROSS, M.B., CH.B., D.P.H., I.M.S., AND P. F. PLOMER, A.M.I.C.E., M.R.S.I., PATNA; SUPDT., GOVT. PRINTING, BIHAR AND ORISSA, 1924. PRICE RS. 8.

Some extracts are given from this very instructive report.

THE preparation and publication every week of the vital statistics of all the municipalities in the province with a population of over 20,000 has been carried out throughout the year.

Weekly epidemic reports from all districts showing the number of seizures and deaths from cholera, small-pox, plague and influenza are also collected, summarised and circulated. The reports are published in the Government Gazette and also by the courtesy of the management in several newspapers of the province. By the publication of these statistics it is hoped to keep the public informed of the actual state of health of the large towns and of the prevalence of epidemic diseases in the districts, and to demonstrate the utility of vital statistics.

Col. Ross proposes to illustrate the value of vital statistics by some practical applications of their uses. In the cold weather of 1922-23 there was a fairly severe recrudescence of epidemic plague in Bihar. In October 1923, Government raised the question of arranging for plague preventive measures in advance for 1923-24. When the question was referred to Col. Ross, he was able to advise Government that extensive preventive measures were not likely to be required because the statistics of the last 19 years clearly showed that a year of recrudescence of plague was followed by a year in which the plague epidemic was much less severe and less widely spread. This proved to be the case and the plague mortality was exceptionally low. The second illustration happened after the end of the year under report. The statistics of the last 12 years have seldom shown that cholera was widespread or prevalent during the month of March. This year cholera was reported from all the districts of the province during March. Col. Ross was able before the end of March to report to Government, and to issue a general warning, that cholera was likely to be very widespread and very prevalent this year. Within a month or less of this report two very severe epidemics actually started in the Tirhut Division and in Shahabad.

In both these instances the careful study of comparative statistics extending over a number of years has proved of immediate practical value.

Periodicity in disease is discussed in the report.

Some diseases, such as plague and small-pox, are more regular in their recurrence, whereas malaria and cholera, which depend more upon favourable climatic conditions for their epidemic spread, are more irregular. It appears, however, certain that each violent epidemic is followed by a corresponding reaction in which the disease is much less prevalent than ordinarily, and that if local and other influences could be eliminated or allowed for, it would probably be possible to define accurately the periodicity of each disease. Each epidemic disease appears to have a different cycle of recurrence, the periodicity of which is based upon the immunity created in the population by the epidemic prevalence of the disease itself. In short it appears that the problem is fundamentally one in immunity, and that the periodicity of epidemic diseases depends upon the degree and the duration of the immunity which results from the general prevalence of the disease.

The price of rice which is the staple food of the province and which may be taken to indicate the general

trend of food prices, does not appear to vary much with the rainfall, and has risen in a most remarkable and consistent manner during the last 18 years.

The death-rate does not appear to be affected materially by the variations in the rainfall and prices, but appears to vary directly with the prevalence of epidemic diseases.

Famine would of course affect both the death-rate and the birth-rate, but famine has not been a factor of any importance during the period under review. The effect of high prices on the birth and death-rates has so far been largely neutralized by the sufficiency of the food supply. The points of outstanding importance demonstrated are that food prices have practically trebled in less than twenty years and that the birth and death-rates which are the basic measure of the public health have been but little affected owing to the sufficiency of the general food supply.

If public health is to improve, progress and effort are essential, and these imply organisation, the spread of knowledge, and expenditure. The expenditure is the immediate difficulty which has been allowed to dominate the situation too long. It appears to create a "vicious circle"—the people are poor because they are not healthy and they are unhealthy because they are poor; they cannot afford to acquire health; therefore nothing can be done.

This is where public health becomes an economic question. Let us not look only upon the difficulties nor be disheartened by the apparent impossibilities. But rather let us accept the proposition that public health is an economic question, and must be dealt with accordingly. Let us admit that we must have funds to meet the expenditure which we know must be incurred, if we are to make any real progress, and let us consider how we may obtain these funds rather than waste time in tinkering with the health of the people.

If we accept the general proposition that agriculture is the great national industry of this province and the only important source of its prosperity; then we must look to improvements in agriculture to increase the prosperity of the people and to provide the means for improving their health.

Some of the methods of dealing with cholera were:

(1) Special preventive measures were carried out by a special staff in connection with the Rath Jatra festival at Puri, and at Sonapur Fair.

(2) The use of chlorinated lime for disinfecting wells has now been generally adopted by local bodies and the procedure is generally known and appreciated.

(3) A special epidemic cadre of ten Assistant Surgeons was maintained. The headquarters of the cadre were at Patna, and these officers were sent out on epidemic duty throughout the province, whenever epidemic disease was prevalent. They were employed on plague duty in Bihar, and cholera duty at Puri and in Orissa and Bihar, and at other times they were employed in carrying out some investigation work.

(4) A special epidemic reserve of one hundred vaccinators was also entertained from 1st April to the end of September for cholera and other epidemic duty.

These men received a few days' training in the use of disinfectants and in the disinfection of wells, and were sent out by the Civil Surgeons with disinfectants and a few simple remedies whenever cholera was reported.

(5) During the year under report the training of vaccinators and *kabiraj*s in disinfection, and in simple preventive measures has been carried out, with the intention that village epidemics might be dealt with more promptly by local agencies.

(6) During the year 3,716 c.es. of cholera vaccine were received from Kasauli and stocked in the Vaccine Depot, Namkum, for issue as required. Three thousand, four hundred and fifteen doses were issued to Civil Surgeons and others on indents received.

(7) During the year a new scheme for a simple and cheap organisation for preventive measures against cholera and other epidemic diseases was issued to all local bodies and it is proposed that this scheme should be taken up as far as funds permit.

(8) At the same time, a leaflet on "Simple Instructions for the Prevention of Epidemic Diseases" was issued to all local bodies, the press and many Government Departments, and many District Boards and Municipalities have reprinted this leaflet in vernacular and distributed it broadcast through schools, sirpunches and other local agencies.

(9) Since the close of the year under report an extensive trial has been made of the use of kaolin in cholera with very satisfactory results. A circular was issued for general information giving details of the use of kaolin, etc., and District Boards and Municipalities have been circularised advising them to adopt this simple treatment which is safe, simple and cheap, and which can be given by any intelligent person.

Col. Ross holds that with the exceptions of particular areas and of epidemic invasions, malaria is not an important cause of mortality in the province of Bihar and Orissa, and that therefore the occurrences of epidemic malaria or influenza may be accurately estimated by any abnormal increase in the reported mortality from fevers.

The economic importance of malaria as a cause of debility, ill-health and ultimate mortality throughout the province is however great. The disease is endemic throughout the province, though to a varying degree in different districts, and it tends to become often epidemic in localized areas where the conditions are favourable to its transmission, and to become generally epidemic over larger areas at intervals.

In the opinion of Col. Ross it is not practicable to prevent malaria, or to reduce it permanently or on any large scale, by the use of quinine. The quantity of quinine required does not exist, and if it did, the people would not swallow it. Quinine is essentially a drug for the treatment of malaria as a disease, but it is not a means of stamping out the disease nor of preventing it on a large scale under existing conditions.

The adoption of non-productive anti-malarial operations such as draining, levelling, filling hollows and oiling water surfaces is also not a feasible means of prevention on a large scale over an enormous area. The staff which would be required to carry out such works and to maintain them would be enormous, and the expense would be colossal and prohibitive.

What is wanted is a policy of malarial prevention which will pay its own way and can be carried out in conjunction with other work of a productive nature.

Such a policy is already being carried out in Italy and Spain with extraordinary success. It consists in combining agricultural improvement with sanitation, by draining or flooding marshes and wet lands in a scientific manner so as to produce larger crops, and at the same time to reduce the breeding of transmitting mosquitoes and the spread of malaria. It also includes the cultivation of waste lands as far as possible and the intensive cultivation of good lands.

The history of plague shows that the disease recurs in epidemic form at intervals of about 70 years, persists for about 30 years or so, and then dies out altogether until the next epidemic comes round. The last two such epidemics are recorded and the occurrence of rat mortality and plague are referred to at frequent intervals in ancient history. We may therefore presume that plague will die out and disappear in due course and this is borne out by the definite, though irregular, decline in the plague mortality during the last fifteen years. It is therefore probable that plague will disappear in another ten or twelve years, and that there is little that we can do in the meantime to accelerate its

disappearance or diminish its prevalence except by the evacuation of infected houses and villages.

Two charts are published which show the effect of introducing piped water-supplies in the towns of Gaya and Bhagalpur. The death-rates from cholera, dysentery and diarrhoea were immediately reduced to about half of what they had been in previous years, and they have since remained at the lower level. This means an average saving of 700 lives from these diseases, chiefly the lives of children, in these two towns alone, every year.

The general prevalence of hookworm infection varies from 50 per cent. upwards to over 75 per cent. of the persons examined in the Patna Lunatic Asylum, in several jails and in the mining population.

Public Health Legislation.

Existing legislation is defective and inadequate in many ways and new legislation is very necessary if any real progress is to be made. Such legislation as is needed must be more simple, more concise, more comprehensive, and must give a strong and definite lead, with a view to requiring and directing a definite advance in public health standards and administration. The only question at issue is:—"How far is it wise to go?" It is admittedly useless to legislate too far in advance of public opinion, but on the other hand it is equally certain that legislation must either go in advance of public opinion and give it a lead—wisely and without undue pressure—or it must and will lag behind, in which case retrogression will take the place of progress, because of the arrest in the advance of public opinion, and the inertia engendered by the failure to use its influence and stimulate its growth.

It is essential to tackle the problems of public health more firmly and with a greater grasp, and to put forward a bigger and a braver policy of legislation and control.

The principles of public health are essentially the doctrines of socialism. The greatest good of the greatest number is the basis of both.

This is altruism, and man is not naturally an altruist, and will not take heed nor action until compelled thereto. It therefore rests with governments to control and care for, and to compel respect for the public health; and to this end there is a need for legislation to control activities, and education to instil knowledge. There is also a need for funds to finance the administration and work of public health; and to this end there is need to create wealth at the same time as expenditure, so that the burden may not become too great.

The initiative in all public health matters will usually rest with governments because there is no prospect of direct personal gain in such matters. The sad slow progress of public health is largely due to this, that it is "nobody's business" and that even governments are apt to neglect its needs for some more popular political demand.

Inasmuch as a nation consists of its people, and its strength is based upon their health and prosperity, so it would appear that the chief duties of any government are those dealing with the health and prosperity of its people.

In other words economic and public health considerations and requirements are fundamental and inseparable, and must be dealt with accordingly. Admit this and base policy upon it. Press for legislative reform and education. Encourage economic prosperity by making "two blades of grass to grow where only one grew before."

"And all other things shall be added unto you"—even Health.

Lt.-Colonel W. C. Ross is to be congratulated on a most interesting and suggestive report and on the excellent work which has been carried out by himself and his staff.

TRIENNIAL REPORT ON THE PROVINCIAL MENTAL HOSPITAL IN ASSAM, 1921-1923. BY COLONEL C. H. BENSLEY, I.M.S., INSPECTOR-GENERAL OF CIVIL HOSPITALS, ASSAM. SHILLONG: ASSAM GOVERNMENT PRESS. PRICE 8 ANNAS.

Lt.-Colonel J. W. McCoy, I.M.S., was in charge of the Assam Provincial Mental Hospital during the triennium until July 1921; Civil Assistant Surgeon B. N. Sen Gupta in July 1921, and Lt.-Colonel W. D. Ritchie, I.M.S., from the 22nd July, 1921. The total number of lunatics under confinement varied from 504 to 551, and shows an increase of some 20 per cent. over the previous triennium. Discharges numbered 53 per annum on an average. Escapes numbered 29, and 23 criminal lunatics were included among those incarcerated per annum. Nearly 28 per cent. of those admitted came from other provinces and were immigrants to Assam. Hindus numbered 73 per cent. of the patients, and Muhamedans 17 per cent. Males were to females as 5.17 to 1. Cultivators and tea garden coolies between the ages of 20 and 40 formed the largest group of patients. Mania and melancholia were the two chief types of insanity present. The death-rate in 1923 was very low, 6.75 per cent. of average strength as against a figure varying from 6.6 per cent. for Bombay to 10.23 per cent. for the Punjab. Influenza, dysentery and tuberculosis head the list of diseases responsible for admissions to hospital, and tuberculosis and pneumonia that of the death-rates. The average annual cost of upkeep was Rs. 84,007 as against Rs. 88,498 for the previous triennium. Profits on manufacture reached a sum of Rs. 13,612 in 1923. The average cost per inmate per annum amounted to Rs. 145 in 1923.

During the triennium one *pucca* barrack for 26 male patients was constructed, but this caused the temporary dismantling of a portion of the female temporary barrack, and reduced the accommodation therein available by 11. Special separate provision is made, as far as possible, for tuberculosis patients. The over-crowding is acute, however, and in Assam—as elsewhere in India—the old-standing scandal of confining non-criminal lunatics in jails for observation still exists. Influenza and malaria made for a somewhat unhealthy condition during the triennium, but the death-rate at this mental hospital is the lowest of any in India, with the exception of that in Bombay. There were 29 escapes during the period, 10 of them from inside the hospital; this last fact is largely due to the wearing out of the portion of the bamboo palisade surrounding the hospital, in the ground. Lt.-Colonel W. D. Ritchie, I.M.S., and Sub-Assistant Surgeon Mukhtar Hussain are mentioned as having done excellent work in the hospital during the triennium under review.

RAJA SIR RAMASWAMI MUDALIAR'S LYING-IN-HOSPITAL, MADRAS. REPORT FOR THE YEAR 1923. BY MAJOR W. C. GRAY, I.M.S., SUPERINTENDENT MADRAS: S. MURTHY & CO., 1924.

The total number of confinements was 1,747 during the year, and 4 other cases died undelivered. The largest number of confinements in any month was 173 in November. Primiparae constituted 24 per cent. of the cases dealt with, and 69 of the patients were sent in by the Madras Corporation Child Welfare Scheme. Natural deliveries totalled 1,023, difficult ones 151, pre-natural ones 44, and complex ones 529. No less than 97 were complicated with infective diseases, including 56 with malaria and 17 with dysentery. With regard to races and castes, 51 per cent. were Hindus, 27 per cent. Adi-dravidas, 16 per cent. Indian Christians, and only 3.5 per cent. Muhamedans. The total number of maternal deaths was 43, including 23 cases admitted in a moribund condition, with a death-rate of 0.86 per cent.; a statement which shews the high standard of the work

carried out in this hospital. Ankylostomiasis with profound anæmia accounted for 7 deaths after delivery. Fœtal mortality was only 4.5 per cent. of the number of live births; 577 non-obstetrical cases were also seen.

Eclampsia occurred in 28 cases,—20 of them primiparae. The treatment adopted was a conservative one, assisting labour when absolutely indicated, and injections of veratrine if the blood pressure was above 130 mm. One case of triplets and 32 of twins occurred among the 1,747 labours. One patient was admitted with complete rupture of the uterus, already 48 hours in labour, and died after hysterectomy. There were 77 cases of abortion. The percentage of live births after forceps operation reached the high total of 95.4 per cent., a figure some 4 to 5 per cent. above that for any previous year. Podalic extraction was resorted to in 7 cases, 5 times for extended breech presentation, once for foot presentation with eclampsia, once in a case of head and foot presentation, with descent of the funis. Perforation was resorted to in 8 cases; the indications being a brow presentation with death of the fœtus, small round pelvis, contracted flat pelvis, an elderly primipara with prolonged labour, and a brow presentation with prolapse of the arm and funis. Cæsarean section was only resorted to once, for contracted pelvis. Fifteen pupils attended the institution during the year for practical training in midwifery.

DISPENSARY RETURNS OF THE PROVINCE OF ASSAM, 1923. BY COLONEL C. H. BENSLEY, I.M.S., INSPECTOR-GENERAL OF CIVIL HOSPITALS, ASSAM. SHILLONG: ASSAM GOVT. PRESS. PRICE RE. 1.

The year opened with 246 hospitals and dispensaries, and closed with 227, 1 being opened and 20 closed during the year, including 15 travelling dispensaries, which were closed on the ground of economy, and especially as their efforts had not met with much success. The number of patients treated totalled 1,599,594 during the year. In-patients numbered 10,732, with a death-rate of 9.30 per cent. The principal causes of admissions to hospital were kala-azar, eye diseases, injuries—local and general,—ulcers, malaria and dysentery. Kala-azar patients numbered 789 in-patients and 10,616 out-patients, as against figures of 414 and 5,472 for the previous year; but this of course only represents a small fraction of the kala-azar work in the province, since the kala-azar survey staff treated some 35,000 cases in Assam during the year. With regard to caste, of the 1,599,594 patients treated, 811 were Europeans and Anglo-Indians, 813,397 Hindus and 560,978 Muhamedans. The total number of surgical operations was 17,703, with a cure rate of 98.08 per cent. and a death-rate of 0.34 per cent. Selected operations numbered 901. The income of the state-public, local fund and private-aided dispensaries was Rs. 7,46,368, of which 59 per cent. was found from provincial revenue, and subscriptions and donations amounted to only 5 per cent. The total expenditure was Rs. 6,07,896. All dispensaries in the infected areas are now fully equipped to deal with kala-azar cases, and the closest co-ordination has been secured between the extensive kala-azar survey under the Public Health Department and the kala-azar work in the hospitals and dispensaries under the Medical Department.

On the whole the year was a healthy one, except for the steady persistence and slow spread of kala-azar. All district boards and municipalities, however, are experiencing very great financial difficulties, and Colonel Bensley appeals for a larger measure of private support. "It is not fair on the medical staff that they should not have the means at their disposal to treat cases properly. It would be better to close a dispensary than to practise what really amounts to a deception on the poor people who come to it with absolute confidence." Finally Colonel Bensley remarks on the extreme pressure of work on all the Civil Surgeons in the more important districts of the province.

KING EDWARD VII MEMORIAL PASTEUR INSTITUTE, SHILLONG. 7TH ANNUAL REPORT FOR 1923. BY LIEUT.-COLONEL E. D. W. GREIG, I.M.S. SHILLONG: ASSAM GOVT. PRESS, 1924. PRICE 12 ANNAS.

THE year 1923 at the Pasteur Institute at Shillong was chiefly remarkable for the frequent changes in personnel. Major H. E. Shortt, I.M.S., officiated as Director from January 1st to 15th; Lt.-Colonel F. P. Mackie, O.B.E., I.M.S., from January 15th to March 24th; Major Shortt again till June 10th; and Lt.-Colonel E. C. Hodgson, D.S.O., I.M.S., from June 11th till the end of the year. Possibly as a result of this, and of a still further change in the directorship since the end of the year, the report for 1923 consists chiefly of statistics.

In all 2,371 patients were treated; in fact the rise in the figures is enormous; in 1917 the number treated was 569; in 1922 it reached 1,728, in 1923 it increased again by some 35 per cent. Europeans treated numbered 150, and "advice cases" which did not require treatment numbered 146. There were 22 deaths from hydrophobia, or a total hydrophobia mortality among the treated of 0.93 per cent., a very low figure when it is noted that jackal bites numbered no less than 490 of the 2,371 patients treated or 21 per cent. of cases, and were responsible for 6 deaths from hydrophobia of the 22. Jackal-bites, which are not seen at the Rangoon Pasteur Institute, and which are relatively few at the Coonoor Institute, are a marked feature of the population treated at Shillong, and the low hydrophobia rate recorded in spite of this fact is very satisfactory. The "failure rate," i.e., percentage of persons treated who developed hydrophobia more than 14 days after completing treatment, was only 12 deaths out of 2,371, or 0.51 per cent. None of the Europeans treated developed hydrophobia.

Of the 2,371 patients treated, 950 came from Assam, 1,361 from Bengal, 56 from Bihar and Orissa and 4 from the Central Provinces.

Turning to the bacteriological, clinical and research side of the Institute, no less than 11 papers were published during the year by Major Shortt, most of them in connection with the kala-azar investigation. The kala-azar patients treated numbered 84, together with 22 cases sent to the Institute as suspected kala-azar cases, but where the diagnosis was not kala-azar. Of these 84 cases, 65 were discharged cured, 5 left before treatment was completed, 7 died, and 7 remained under treatment at the end of the year. Urea stibamine was used to a large extent, and as our readers know already, the reports on its use are very favourable. Bayer's 205 and urotropine proved useless in the treatment of kala-azar. Assistant Surgeon Ram Taran Sen was in charge of the kala-azar hospital throughout the year.

The work of the Shillong Pasteur Institute on diphtheria in the boarding schools in Shillong has already been published in our columns. The Schick test was introduced into India for the first time and the disease is now fully under control, and the year 1923 was the first since 1917 when the boys' and girls' schools at Shillong were free from this infection,—one which is usually rather prevalent in boarding schools in hill stations in India. Of 242 children examined in 1923, 16 were found to be carriers, 4 of them harbouring virulent strains. The vaccine section, which is now only a distributing centre, sent out 18,585 c.c. of anti-influenza vaccine during the year; 71,630 c.c. of anti-cholera vaccine, and 748 c.c. of anti-enteric "T.A.B." vaccine.

The report closes with the usual detailed statistical tables. These were first introduced into Pasteur Institute work in India by Lt.-Colonel W. F. Harvey, C.I.E., I.M.S., in 1912, at Kasauli. As a result, there has now accumulated such a wealth of accurate, detailed and reliable information with regard to the problems of "dog-bite" that we wonder whether the time has not now arrived for this enormous mass of collected statistical evidence to be sifted by some mathematical and

epidemiological expert. The information thus laboriously collected for some 12 years covers some hundreds of thousands of patients, and its analytical study should yield information of very great value.

Correspondence.

GANGOSA IN INDIA.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—I was greatly interested in the case of gangosa reported in the *Indian Medical Gazette* for August 1924 by Mr. H. T. Holland, from the C. M. S. Hospital at Quetta, and in Col. Tyrrell's letter in the November number of the *Gazette* describing a case of the same disease seen and treated by him in Malwa, Central India, some fifteen or sixteen years ago.

Nearly eight years ago, I detected a case among the inmates of the Acworth Leper Asylum at Matunga in Bombay, and described it with a photograph in an article on gangosa in the *Indian Medical Gazette* for February 1917. The article not only gives a detailed description of the disease, but I have in addition fully discussed therein the various views held with regard to its causation; a complete list of the literature then available on the subject is also given. Under the heading, geographical description, my remarks run as follows:—"I can find no record as to the existence of this disease in India; it is however probable that it does exist in this country and is mistaken either for syphilis or leprosy."

Soon after the publication of that article, a medical practitioner from the Central Provinces sent me clinical notes of two cases of gangosa, which he came across, if I remember rightly, in the city of Nagpur. Unfortunately the correspondence has been mislaid.

It would be interesting to know if any other cases have been recorded, for there is now every reason to believe that gangosa does exist in India, but is mistaken for either leprosy or syphilis. The photographs published in Mr. Holland's paper and in my article might help in the detection of this curious tropical disease, the etiological factor of which is still unknown.—Yours, etc.,

D. A. TURKHUDD, M.B.C.M. (Edin.),
Acting Director, King Institute.

GUINDY, MADRAS:
18th November, 1924.

INTRAVENOUS IODINE.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—Since my article on intravenous iodine was published in your columns, I have been receiving letters enquiring about the actual preparation of my solution. As it is not possible to reply to these individually, I ask your permission to publish the formula, which is as follows:—

| | | |
|---|-------------|-------------------|
| ℞ | Iodine | .. 1 drm. |
| | Pot. Iodide | .. 1 drm. |
| | Aq. dest. | .. 5 ozs. 2 drms. |

The iodine is dissolved in the solution of potassium iodide in distilled water, previously prepared.

Adult dose—3 to 6 minims given intravenously.—Yours, etc.,

J. C. CHAUDHURI, L.M.S.,
Vice-Chairman.

DISTRICT BOARD, BOGRA:
2nd December, 1924.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—In your November issue two articles have appeared by Dr. P. Bell, I.M.D., and Dr. J. C. Chaudhuri on the value of intravenous iodine.

I have used intravenous iodine since 1909 when at the Remount Depot, Mona (Punjab), for the first time with very encouraging results, and in private work it is the very first drug for me. Recently, I had an

FEB., 1925.]

opportunity to use it in a case of acute phthisis with severe hæmoptysis, and the only suggestion I have to offer in iodine medication is to always combine it with adrenaline solution (1 in 1000) m.x. to 1 c.c. Also I have always preferred to use normal saline solution rather than either rain or distilled water. The aqueous solution is a hundred times better than the spirituous, and this should be obvious to any scientific worker.—Yours, etc.,

B. J. BOUCHE,
Asst. Surgeon, I.M.S.

JUTOGH, SIMLA HILLS:
13th November, 1924.

Service Notes.

APPOINTMENTS AND TRANSFERS.

The services of Lieutenant-Colonel T. C. McCombie Young, M.D., I.M.S., are placed at the disposal of His Excellency the Commander-in-Chief with effect from the 20th November 1924.

Lieutenant-Colonel N. M. Wilson, O.B.E., I.M.S., made over charge of the duties of Superintendent of the District Jail at Ambala to Major B. Gale, I.M.S., on the afternoon of the 19th November 1924.

Lieutenant-Colonel H. C. Keates, I.M.S., made over charge of the duties of Superintendent of the District Jail at Lyallpur to Lieutenant-Colonel R. T. Wells, I.M.S., on the forenoon of the 28th November 1924.

Major F. Stevenson, I.M.S., an officiating Agency Surgeon, is posted as Agency Surgeon, Gilgit, with effect from the 3rd November 1924.

The services of Major H. Stott, O.B.E., M.D., I.M.S., are placed temporarily at the disposal of the Government of the United Provinces with effect from the date of his appointment as Professor of Pathology, King George's Medical College, Lucknow.

The services of Major T. D. Murison, I.M.S., are placed permanently at the disposal of the Government of Assam with effect from the 20th November 1924.

The services of Captain C. de C. Martin, M.B., I.M.S., an officer of the Medical Research Department, are placed temporarily at the disposal of the Government of Madras for appointment as Officiating Assistant Director, King Institute of Preventive Medicine, Guindy, with effect from the date on which he assumes charge of his duties.

The services of Captain R. C. Malhotra, O.B.E., I.M.S., are placed permanently at the disposal of the Government of the Punjab with effect from the 4th April 1924.

LEAVE.

Lieutenant-Colonel A. C. MacGilchrist, I.M.S., Civil Surgeon, is allowed leave on average pay for two months, with effect from the 3rd November 1924.

Captain J. E. Dhunjibhoy, M.B., I.M.S., Superintendent, Central Mental Hospital, Berhampur, is allowed extension of leave for eighteen days.

Lieutenant-Colonel O. St. John Moses, M.D., I.M.S., is allowed leave on half average pay for four months, in extension of the leave granted to him in Notification No. 2867-Medl., dated the 5th September 1922.

Major L. H. L. Mackenzie, I.M.S., an officiating Agency Surgeon, is granted leave on average pay for 8 months combined with leave on half average pay for 1 year and 24 days, under Fundamental Rule 81, with effect from the 3rd November 1924.

PROMOTIONS.

Lieutenant-Colonel to be Colonel.

Robert Welland Knox, D.S.O., M.B., F.R.C.S., I.M.S., vice Colonel Harold John Kinahan Bamfield, D.S.O., K.H.P., I.M.S., promoted to the rank of Major-General, with effect from the 24th September 1924. Colonel Knox's tenure of appointment will count from the 3rd October 1924.

The promotion to his present rank of Major H. B.

Scott, O.B.E., F.R.C.S.E., I.M.S., is antedated from the 1st September 1918 to 1st March 1918.

The promotion to his present rank of Major A. N. Thomas, D.S.O., M.B., I.M.S., is antedated from the 27th July 1919 to 27th January 1919.

RELINQUISHMENT OF RANK.

Major W. D. H. Stevenson, M.D., D.P.H., C.I.E., I.M.S., relinquished the temporary rank of Lieutenant-Colonel on vacating the appointment of Assistant Director-General, Indian Medical Service on 10th February 1922.

Captain (Acting Major) W. E. Brierley, I.M.S., relinquished his acting rank on the 31st January 1920 (afternoon) on substantive promotion to the rank of Major, with effect from the 1st February 1920.

RETIREMENT.

The King has approved the retirement of Major-General J. Jackson, C.I.E., M.B., K.H.P., I.M.S., from the 24th September 1924.

NOTICES.

NUJOL.

"CHRONIC mucous colitis"—of whatever origin—is one of the bug-bears of medical practice in India. Neglected and chronic amœbic or bacillary dysentery, visceroptosis, chronic intestinal stasis with all its attendant complications, perhaps serve to explain the great frequency of this condition in tropical medical practice.

When faced with such cases the medical practitioner is often puzzled to know what aperient to prescribe. We consider that there can be only one answer; liquid paraffin or some other absolutely non-irritant and mechanical purgative. In all conditions of intestinal stasis, as well as in the intestinal tuberculosis which is so common in India, liquid paraffin is indicated as the best of aperients. "Nujol," a product of the Standard Oil Co. of New Jersey, it is claimed, presents liquid paraffin in pure form as an intestinal lubricant. It is claimed that it is entirely unacted upon by the intestinal ferments, is not absorbed, and it has been advocated by Dr. J. H. Kellogg in his book on "Colon Hygiene." In the course of preparation the product is finally held in glass-lined tanks, from which samples are withdrawn for tests as to purity and chemical composition. Lastly, it is claimed that its continued use in the habitual constipation of women is free from all the customary difficulties of increased dosage and absolute dependence attendant upon the use of other purgatives. The Indian agents are Messrs. Muller and Phipps, 21, Old Court House Street, Calcutta; and 14 to 16, Green Street, Bombay.

PSICAINE; A NEW LOCAL ANÆSTHETIC.

AN announcement by the celebrated firm of E. Merck & Co., Darmstadt, of the discovery of a new and non-toxic local anæsthetic with twice the potency of cocaine, and free from many of the dangers attending cocaine administration, will be of special interest to our readers. Psicaine, the new local anæsthetic thus discovered, is a synthetic product, not derived from the leaves of the cocoa plant, but an isomer of cocaine with similar and yet dissimilar properties. So far, in England and under the Hague Opium Convention Act of 1912, it has not come under the rules applied to opium and cocaine, whilst the drug is at present under investigation by the British Ministry of Health. There are theoretically possible twelve isomers of cocaine, of which at present six have been synthetically prepared in Messrs. Merck's laboratories at Darmstadt. Psicaine is the acid tartrate of the dextro-rotatory pseudo-cocaine; viz., d-4-cocaine, and is a white, crystalline powder soluble in four parts of water, but less readily soluble in alcohol. The aqueous solution is acid, has a bitter taste, but when placed upon the tongue produces prolonged numbness. Its solution will bear sterilisation at 110°C. without decomposition.

It is also more soluble in lipoids than is cocaine, and therefore might be expected to have a greater anæsthetic value.

On experimental tests, it is claimed that this compound has twice the local anæsthetic value of cocaine, with no symptoms of accumulation or intoxication in experimental animals. Apparently it is also more rapidly excreted from the system. It is a vaso-dilator, rather than a vaso-constrictor, and its absorption from mucous membranes appears to be gradual. Beringer and Williams report that in doses which correspond it does not cause nausea or collapse, as does cocaine, and it does not produce the same feeling of euphoria.

Hitherto cocaine has held its own against all attempted substitutes, but psicaine may apparently come to replace it. It is recommended for rhino-laryngological work in a solution of 5 to 10 per cent.; for urological work in a solution of $\frac{1}{2}$ to 1 per cent.; for ophthalmological work in a 2 to 5 per cent. solution. It should be used exactly as is cocaine, and adrenalin may be added to the solution. At present it is available only in powder form in bottles of 1, 5, 10 and 100 grammes, and the Indian agents are Messrs. Martin & Harris, 8, Waterloo Street, Calcutta. The *Chemist and Druggist* drew attention to this new compound in an editorial article in its issue for the 12th of July 1924, whilst several reports by German and other workers speak of it very favourably.

Finally, it is claimed that there is here a drug which may be of value in cure of the cocaine habit. Willstätter, the distinguished Munich chemist, has analysed the cocaine molecule and has shewn, in a series of researches lasting for some years, that there may be many isomeric forms. Gottlieb has suggested the experimental use of some of these isomers. Psicaine is dextro-rotatory, whereas cocaine is levo-rotatory, whilst the former was found to have only one-half of the toxicity of the latter. Whereas cocaine is excreted through the kidneys after administration, psicaine is not—except in minimal quantities, and is apparently decomposed within the system more rapidly than is cocaine. Under such circumstances it may become a useful substitute for cocaine in cases of cocaine addiction.

The drug is clearly at present upon experimental trial; but future reports as to its clinical value will be awaited with interest.

CALCIUM METABOLISM IN TUBERCULOSIS.

AN interesting report in the *Organotherapeutic Review* for October 1924 deals with this subject. Dr. H. R. Harrower in 1913 advocated administration of splenic substance in cases of tuberculosis, following the lead of Bayle in 1912 at the International Congress on Tuberculosis held in Rome in that year. In a batch of rabbits inoculated with spleen nucleo-protein solution at the Harrower Laboratory it was found that the injections had been followed by a considerable increase in the ionic calcium content of the blood. It has long been known that administration of parathyroid extract is followed by a similar result, and parathyroid therapy has now taken its place in the treatment of tetany, sprue, and other diseases where there is apparently a deficiency in the blood calcium content, but the action of splenic extract was found to be even more marked; in some instances as much as an increase of 3 mgms. of blood calcium per 100 mls. of blood having been noted. Further the blood was rendered more coagulable.

In tuberculosis calcium loss is the rule. In all states of chronic ulceration accompanied by parathyroid deficiency it is now customary to prescribe parathyroid extract, whilst the splenic extract appears to be even more efficacious. The Harrower Laboratory (Endocrines, Ltd., Simla), have accordingly placed upon the market two preparations;—Parathyroid Co. (Harrower), which contains parathyroid extract together with desiccated splenic nucleo-proteid, and Solution Para-Spleen Co. (Harrower), which contains a 4 per cent. solution of the active extract of parathyroid and splenic glands

for hypodermic injection. The former, it is suggested, is suitable for oral administration, and the latter for hypodermic administration, in graduated doses.

That calcium metabolism is intimately bound up with the problems of the successful therapy of tuberculosis appears to be certain, and any advance in such investigations is to be welcomed.

FORESIGHT IN PHOTOGRAPHY.

FRESHNESS appears to be as much an attribute of Burroughs Wellcome & Co.'s literature as it is of 'Tabloid' Photographic Chemicals. Time does not change nor custom wither their infinite variety and freshness. We do not know how many years have elapsed since this firm first issued its annual booklet advocating sound photographic technique in regard to time and temperature development and other processes, but they were certainly pioneers in the matter. Their advocacy of these sound methods continues, but every year they give us something fresh.

This year, under the title "Foresight in Photography," their booklet is particularly breezy. On the cover is a blue-toned photogravure reproduction of Commander Wild in the crow's nest of Sir E. Shackleton's *S.S. Quest*, and throughout the text pages the smack of the sea is continued as we read how modern scientific methods of navigation and photography follow similar methods of precaution as guides to the harbour of success.

For instance, "Development by Chart" is a happy title to the chapter on the time development, and the comparison of the nautical compass with the photographic calculator is no less apposite.

Among the illustrations is a particularly interesting and novel presentation of the effects of chromium intensification and of the possibility of subsequent modification by the use of reducers and other methods. We have never seen this point demonstrated before.

The booklet contains a classification of plates and films according to their development speeds, time tables for development and much other useful matter. Readers can obtain a copy gratis and post free by application to Burroughs Wellcome & Co., Post Box 290, Bombay, if they mention this journal.

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Original Articles.

VARIATIONS IN THE POTENCY OF DIGITALIS PREPARATIONS IN THE TROPICS.

By R. N. CHOPRA, M.A., M.D. (Cantab.),

MAJOR, I.M.S.,

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Physician in charge Cardiac Department, Carmichael Medical College Hospitals;

and

P. DE, M.B. (Cal.),

CAPT., LATE I.M.S.,

Assistant Professor of Pharmacology, Calcutta School of Tropical Medicine.

PRATT (1910) was one of the first to point out the inefficiency of some of the digitalis preparations on the market. Goodall (1912) examined a number of tinctures of digitalis over a period of three years and found great variations in their potency. Hatcher and Eggleston (1913) investigated the keeping properties of digitalis leaf and some of its preparations, on account of the prevalent idea among physicians that they undergo deterioration very rapidly. They employed mainly the "cat method" and in some instances the "one hour frog method" to estimate the activity of the specimens. They assayed, in this way, samples of leaves (ground and unground), tinctures and fluid extracts ranging from less than one to more than thirty years old. They came to the conclusion that commercial leaves of good quality, unless they were mouldy, showed little deterioration. Pharmacopœal preparations containing 50 per cent. of alcohol according to them showed no greater deterioration than the leaves. Roth (1916) found by the "one hour frog method" large variations in the strengths of tinctures. Newcomb and Rogers (1918) laid much emphasis on the effects of temperature on the strength of various preparations and considered that even chilling below 40° F. for a short time decreased the potency of tinctures by an increase in the natural precipitation, which carried down some of the active principles of the drug.

Tate (1921) pointed out that tinctures of standard strength deteriorate in a warm climate like that of India owing to heat, and need to be frequently tested. He suggested that all the tinctures made from mixed Indian leaves and stored in the Government Medical Store Department should be tested once a year. Canby Robinson (1922) showed that in America tinctures kept in a hospital room in a five-gallon container, and which to begin with were of standard strength (1 c.c. = 1 cat unit), lost 50 per cent. of their efficiency at the end of one year. Brot

(1923) showed that digitalis lost 43 per cent. from heating in aqueous extract and 16 per cent. by treatment with alcohol.

It will thus be seen that though difference of opinion exists as regards the keeping properties of digitalis leaf and its preparations, most of the evidence goes to show that the strength of tinctures undergoes deterioration, especially if the temperature is high. Our attention was drawn to this as we found that the majority of our patients who were given tinctures of digitalis required a much larger quantity and a longer time to get under the digitalis effect than would have been necessary if the tinctures had had the potency of a standard tincture (1 c.c. = 1 cat unit). Eggleston has calculated that the average amount inducing full therapeutic effects within 36 to 48 hours in an adult man, who has not received digitalis previously, is about 1.5 gm. of the leaf or 15 c.c. of the tincture per 100 pounds of body weight; the tincture being given in divided doses at intervals of 4 to 6 hours. According to Mackenzie, 5 to 8 drams of tincture usually produce the desired effect. We tried tinctures of several makes and found that in every case a much larger amount of the tincture was required than that calculated according to the above formula. We therefore decided to carry out biological as well as chemical assays of a number of tinctures which we had used on patients in order to see whether the larger amounts required were due to deterioration of the potency of the tinctures, or to some other cause.

We selected the tinctures manufactured by one of the best and most reliable firms for our investigation.

Method of assay.—Our biological assays were carried out by Hatcher and Brody's "cat method." Two cats were used for each assay, and if the results varied largely the test was applied to a third cat for confirmation. Chloretone 0.2 gm. per kilo. body weight was administered intraperitoneally as an anæsthetic. The tinctures were diluted with 9 parts of physiological saline and the injections were made into the femoral vein. The average time occupied for injections was 60 to 90 minutes, the rate of injection being 1.0 c.c. of diluted tincture in 2½ to 3 minutes. In no instance was the combined method of finishing up the assay with ouabain used. Our chemical assays were done by Kundson and Dresbach's improved method, and we are very grateful to Mr. N. Ghosh for the trouble he has taken in making these assays.

Clinical trials.—In table I we have put down the results of use of tinctures of digitalis, manufactured by one of the best firms, in a series of cases. Each patient was given a four ounce sealed bottle of standardised tincture of digitalis, the latest stock available. He kept the bottle tightly corked and in a cool and dark place. Each dose was accurately measured out, diluted with water, and taken on an empty stomach. No

TABLE I.

| No. | Race, age and weight of the patient. | Cardiac and other lesions present. | Amount in drs. necessary to get the patient under digitalis. | No. of days of digitalis administration to get the patient under. | Amount of standard tincture (1 c.c.=1 cat unit) required for digitalis effect. | Date of manufacture of the tincture. | Date of use of tincture. | REMARKS. |
|-----|---|---|---|---|--|--------------------------------------|--------------------------|--|
| 1 | European 41 years 168 pounds. | Mitral stenosis hypertrophy, auricular fibrillation, tachycardia. | 18 drs. + 1/100 gr. of strophanthin (Merck) to reduce pulse from 140 to 85 per minute. | 13 days. Dose 80 minims daily. | 7.1 drs. | May 1923. | Aug. 1923. | |
| 2 | Hindu male 70 years 126 pounds. | Granular kidney, arterio-sclerosis, myocardial degeneration, tachycardia. | 14 drs. to reduce pulse from 108 to 70 per minute. | 15 days. Dose 60 minims daily. | 5.4 drs. | Oct. 1923. | Jan. 1924. | |
| 3 | Hindu female 14 years 80 pounds. | Aortic regurgitation, mitral stenosis, rheumatic myocarditis. | 14 drs. to reduce pulse from 140 to 90 per minute. | 16 days. Dose 60 minims daily. | 3.4 drs. | Oct. 1923. | Feb. 1924. | |
| 4 | Hindu male 62 years 140 pounds. | Granular kidney, arterio-sclerosis, myocardial degeneration, tachycardia. | 14 drs. to reduce pulse from 110 to 80 per minute. | 12 days. Dose 90 minims daily. | 6.0 drs. | Nov. 1923. | Feb. 1924. | |
| 5 | Hindu female 28 years 100 pounds. | Aortic regurgitation, mitral stenosis, rheumatic myocarditis, auricular fibrillation. | 15 drs. + 1/200 gr. of strophanthin (Merck) to reduce pulse from 160 to 80 per minute. | 13 days. Dose 90 minims daily. | 4.3 drs. | Nov. 1923. | Jan. 1924. | |
| 6 | Hindu female 78 years 140 pounds. | Granular kidney, arterio-sclerosis, myocardial degeneration, auricular fibrillation. | 12 drs. to reduce pulse from 160 to 90 per minute. | 10 days. Dose 120 minims daily. | 6.0 drs. | Nov. 1923. | Jan. 1924. | |
| 7 | Hindu male 59 years 140 pounds. | Angina pectoris, tachycardia, myocardial degeneration, arterio-sclerosis. | 29 drs. to reduce pulse from 100 to 70 per minute. | 26 days. Dose 120 minims daily. | 6.0 drs. | Jan. 1924. | July 1924. | |
| 8 | Hindu female 45 years 130 pounds. | Tachycardia, emphysema, diabetes, heart failure. | 14 drs. to reduce pulse from 136 to 95 per minute. | 16 days. Dose 60 minims daily. | 5.6 drs. | Jan. 1924. | July 1924. | |
| 9 | Hindu male 53 years 125 pounds. | Mitral stenosis, rheumatic myocarditis, tachycardia. | 21 drs. to reduce pulse from 100 to 60 per minute. | 30 days. Dose 60 minims daily. | 5.3 drs. | Apr. 1924. | Aug. 1924. | |
| 10 | Hindu male 52 years 115 pounds. | Granular kidney, myocardial degeneration, tachycardia. | 10 drs. to reduce pulse from 112 to 88 per minute. | 9 days. Dose 120 minims daily. | 5.0 drs. | Apr. 1924. | Sept. 1924. | |
| 11 | Hindu male 52 years 140 pounds. | Mitral stenosis, auricular fibrillation, rheumatic myocarditis. | 17 drs. 1/200 gr. of strophanthin (Merck), 2 injections, and 60 c.c. of digitipuratum to reduce pulse from 118 to 102 per minute. | 10 days. Dose 6 c.c. daily. | 10.0 drs. | Apr. 1924. | Aug. 1924. | Digitipuratum had to be given up and tincture digitalis (Parke Davis) given. Total 9 drs. + 1/200 gr. of strophanthin to reduce heart rate from 102 to 70 in 5 days. (60 c.c. fluid digitipuratum = 45 grs. of powdered leaf.) |

TABLE I.—(Concl'd.)

| No. | Race, age and weight of the patient. | Cardiac and other lesions present. | Amount in drs. necessary to get the patient under digitalis. | No. of days of digitalis administration to get the patient under. | Amount of standard tincture (1 c.c.=1 cat unit) required for digitalis effect. | Date of manufacture of the tincture. | Date of use of tincture. | REMARKS. |
|-----|---|--|--|---|--|--------------------------------------|--------------------------|----------|
| 12 | Hindu male 45 years 150 pounds. | Aortic dilatation, syphilitic myocarditis, tachycardia. | 18 drs. of tinct. digitalis + 1½200 gr. strophanthin (Merck) to reduce pulse to 85 per minute. | 20 days. Dose 60 minims daily. | 6.4 drs. | Apr. 1924. | Oct. 1924. | |
| 13 | Hindu male 50 years 150 pounds. | Aortic dilatation, syphilitic aortitis. | 4 drs. of tinct. digitalis prepared in Chemical Laboratory of School of Tropical Medicine to reduce pulse from 100 to 80 per minute. | 4 days. | 6.4 drs. | .. | .. | |
| 14 | Hindu male 38 years 160 pounds. | Myocardial degeneration, granular kidney. | 9 drs. of tinct. digitalis prepared in Chemical Laboratory of School of Tropical Medicine to reduce pulse from 120 to 90 per minute. | 9 days. | 6.8 drs. | .. | .. | |
| 15 | Hindu female 17 years 120 pounds. | Rheumatic myocarditis, mitral stenosis, aortic regurgitation, tachycardia. | 10 drs. to reduce pulse from 140 to 90 per minute. | 12 days. | 5.1 drs. | July 1924. | Nov., 1924. | |

other drugs were taken along with it. It will be observed that although adequate doses had been given, in no case was the complete effect brought about by the amount calculated to be necessary if the tincture had been of standard potency. In the majority of cases double the amount was necessary and was required over a longer period. In cases Nos. 1 and 5 intravenous injections of strophanthin were used in addition. In case No. 11 digitipuratum was tried and here also a larger dose was required and strophanthin had to be given in addition and even then the heart was only imperfectly under. It may be mentioned here that the "digitalis effect" is produced when signs of minor digitalis intoxication, such as nausea and vomiting, marked anorexia, reduction of the heart rate below 80, appearance of occasional premature beats, coupling of the beats, and diminished diuresis occur. Directly one or other of these events occurs, the drug is stopped or greatly reduced. It is worthy of note that the stage of optimum therapeutic effect usually merges into that of minor digitalis intoxication.

Discussion on Table I.—The doses of tinctures used in this series were 20 to 30 minims of the tincture three times daily and the average period necessary to get the patient under digitalis was in most cases 12 days, and in some cases considerably longer. From this it can be imagined how long it would take to get a patient under

digitalis if the doses ordinarily prescribed by medical practitioners in India—i.e., 5 to 10 minims three times a day—were given. It has been calculated that an average healthy adult destroys about 22 minims of tincture in 24 hours and this quantity passes out of the body without producing any therapeutic effect. The balance accumulates in the heart muscle till sufficient concentration is reached to produce its effect. At this rate it would take a month or even longer, and the quantity of the tincture required to be used would be considerably more because proportionately larger amounts will be destroyed by the body as its use is spread over a longer period. Medical practitioners somehow seem to be afraid of giving large doses of tincture for the reason that it is supposed to cause poisoning. It has been shown that poisoning with digitalis is very rare, as nausea and vomiting supervene quickly with the advent of toxic dosage or even before that is reached. As much as one minim of the ordinary tincture per pound weight (two drachms for a man weighing 120 pounds) can be given in a single dose if quick therapeutic effects are desired, without producing untoward symptoms, provided certain precautions are followed. After the therapeutic effect is produced the dose can be reduced to 10 minims three times a day to keep the heart under digitalis effects. In cases Nos. 13 and 14 a tincture prepared in our laboratory from fresh leaf grown in Kashmere

was administered. The dose required with this preparation was nearly the same as with a tincture of standard strength.

Biological and Chemical Assays.—In Table II, we have put down details of the biological assay of the tinctures used in Table I, and also the results of chemical assays of a number of these tinctures. It will be observed that when tested by the "cat method" the potency of the tinctures

carefully filtered to prevent obstruction of the coronary artery with emboli, are very toxic to cats when given intravenously and produce sudden death with much smaller doses than the standard tincture. If the assay is done with the guinea-pig or frog method in which the tinctures are injected subcutaneously, they do not show this increased toxicity, but a great reduction in their potency is evident. We have noticed that

TABLE II.

| No. | Date of manufacture of tinct. digitalis. | Character of tincture on dilution. | Amount of standard tincture that ought to have been required per kilo. | Amount of tincture required to complete assay by Hatcher's cat method per kilo. | Time taken to complete the assay. | Chemical assay. | REMARKS. |
|-----|--|------------------------------------|--|---|-----------------------------------|-----------------|---|
| 1 | May 1923 .. | Solution blackish. | 1 c.c. | 0.875 c.c. | 45 minutes | .. | |
| 2 | October 1923 .. | Blackish .. | 1 c.c. | 0.938 c.c. | 48.5 minutes | 1 standard=1.8 | |
| 3 | October 1923 .. | Do. | 1 c.c. | 0.875 c.c. | 35 minutes | .. | |
| 4 | November 1923 | Opalescent green. | 1 c.c. | 1.28 c.c. | 70.5 minutes | 1 standard=3.8 | |
| 5 | November 1923 | Do. | 1 c.c. | 1.66 c.c. | 72 minutes | 1 standard = 4 | |
| 6 | November 1923 | Do. | 1 c.c. | 1.33 c.c. | 92 minutes | .. | |
| 7 | January 1924 .. | Do. | 1 c.c. | 1.2 c.c. | 40 minutes | .. | |
| 8 | January 1924 .. | Do. | 1 c.c. | 1.353 c.c. | 52.5 minutes | 1 standard=2.2 | |
| 9 | April 1924 .. | Light yellowish green. | 1 c.c. | 1.57 c.c. | 93 minutes | 1 standard=2.5 | |
| 10 | April 1924 .. | Opalescent green. | 1 c.c. | 0.954 c.c. | 65 minutes | .. | |
| 11 | April 1924 .. | Do. | 1 c.c. | 0.954 c.c. | 65 minutes | .. | |
| 12 | April 1924 .. | Do. | 1 c.c. | 1.11 c.c. | 72 minutes | .. | |
| 13 | Tincture from Kashmiri leaves. | Opalescent darkish green. | 1 c.c. | 0.688 c.c. | 56 minutes | .. | |
| 14 | Do. | Do. | 1 c.c. | 0.688 c.c. | 56 minutes | .. | |
| 15 | July 1924 .. | Yellowish green | 1 c.c. | 1.25 c.c. | 68 minutes | 1 standard=2.2 | |
| 16 | April 1924 .. | Opalescent green. | 1 c.c. | 1.39 c.c. | 80 minutes | 1 standard=3.8 | Tested in laboratory. Not tried clinically. |
| 17 | April 1924 .. | Do. | 1 c.c. | 1.46 c.c. | 105 minutes | 1 standard=3.8 | Do. |

showed a reduction in most cases of from 20 to 40 per cent.; the chemical method of assay shows a much larger reduction.

Discussion on Table II.—In the assay of tinctures Nos. 1, 2 and 3 a much smaller quantity was required to produce lethal effects than would have been necessary with the ordinary standard tincture. Most of the good tinctures when they are diluted with 9 parts of physiological saline give an opalescent light-green colour. Some of the tinctures, however, form a blackish solution on dilution which is not uniformly opalescent, but contains particles of what looks like precipitated matter. These tinctures, though they were

this change occurs in the tinctures when they have been stored for some time, especially during the hot weather months. In some of the tinctures made from Indian leaves which we assayed a few years ago and which had been lying in store for some time during the hot weather we found that this change had occurred. What chemical changes take place which increase the toxicity we have not been able to determine. The freshly prepared tinctures from the Indian leaf in some cases were slightly darkish in colour on dilution as compared with imported tinctures, but were uniformly opalescent. It may be pointed out that the biological assay tells us how much

of the active principles of digitalis are lethal to the animal. It is by no means certain that the active principles that produce death are the glucosides which cause therapeutic effects, though in fresh tinctures at any rate there is a distinct relationship between the two (see Tables I and II: clinical trials and assays Nos. 13 and 14 of fresh tinctures made from Kashmere leaf). It is quite obvious from a perusal of the tables that samples of tinctures which in small doses are quite strong enough to be lethal to cats when given intravenously, are perfectly useless when administered by the mouth to man. They are probably decomposed in the alimentary tract and rendered inert and innocuous. From the observations which we have made with a number of tinctures in Calcutta we have come to the conclusion that a correctly assayed and standardised tincture of digitalis passes through the following stages with age and high temperature:—

(1) At first it becomes less potent and less toxic to animals, i.e., instead of the M. L. D. for a cat being 1 c.c. of the tincture per kilo. body weight it becomes 2 to 2.5 c.c.

(2) As further changes occur, certain products are formed and the tincture becomes more toxic to animals when given intravenously. The M. L. D. for a cat then becomes 1 c.c. per kilo. body weight or less, though its therapeutic efficiency is considerably reduced.

It is quite evident from the data which we have accumulated in the tables that no single method of assay, either biological or chemical, can be relied upon by itself as a test for the potency of a tincture which has been in a tropical climate for some time.

Naked eye changes of colour and turbidity give information and should always be observed. It would appear that the only infallible way of judging the potency of a tincture in the tropics is the *clinical method*, i.e., testing the tincture on diseased hearts in man. A tincture that can digitalize a patient with auricular fibrillation at an average dose of 15 c.c. of tincture per 100 pounds body weight is certainly the most dependable preparation, whether or not the biological test is satisfied.

Summary and Conclusions.

(1) Clinical observations as well as biological and chemical assays of tincture of digitalis show that it undergoes deterioration rapidly in a tropical climate such as that of India.

(2) This deterioration cannot be accurately determined by any single method in the laboratory, such as Hatcher's "cat method"; the "frog method"; or Kundson and Dresbach's chemical method.

(3) Clinical tests give the most reliable information. The average dose of 15 c.c. (or 4½ drachms) of the tincture per 100 pounds of body weight required to get the patient under digitalis effect in 36 to 48 hours is considerably increased after the tincture has been in the tropics even for a short time.

(4) Deterioration is due to some change in the digitalis glucosides, the nature of which has not yet been determined. The tinctures on dilution become darkish in colour, unlike good tinctures which are light green and uniformly opalescent. Such tinctures are more toxic to cats when given intravenously, but a considerable weakening in the therapeutic efficacy is evident.

(5) The dosage of tincture of digitalis generally employed by medical practitioners in India (i.e., 5 to 10 minims three times a day) is far too small to get the patient under the digitalis effect within a reasonable period, (3 to 4 days).

(6) With tinctures of standard strength doses of at least 20 to 30 minims three times a day should be given. If rapid effects are desired in urgent cases these may be increased from 45 to 60 minims till the amount calculated by Eggleston's method is given.

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AN INVESTIGATION INTO THE ORIGIN OF CHOLERA EPIDEMICS IN THE JHERIA COAL-FIELDS.

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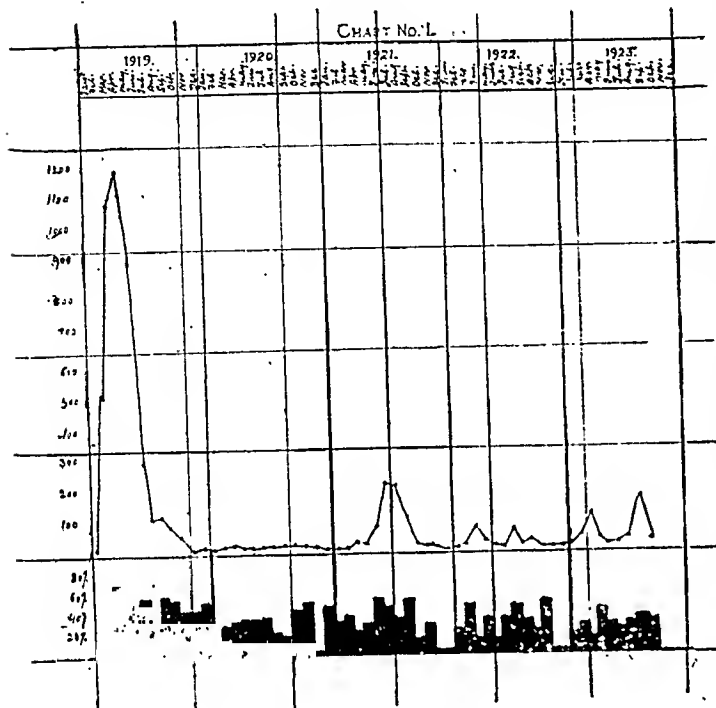
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OCCASIONAL epidemics of a disease, which is clinically cholera, have been known in the coal-fields for a long time, and have occupied a conspicuous place in the statistical reports of

the Mines' Board of Health. Such cases are returned almost throughout the year, but high case incidence and high mortality are noticeable only at certain seasons, (*vide* chart No. 1).

CHART.



Detailed consideration of the chart:—The monthly figures for cholera with corresponding mortality rates per 100 seizures have been depicted for 5 consecutive years from 1919 to 1923. The vertical columns at the bottom represent the mortality rate, and the curve in black lines the number of cases reported both from the collieries and rural areas in the mining settlement. A close examination of the chart will shew that while the maximum mortality rate corresponds closely to the height of the outbreak in the real epidemic year of 1919, it is erratic for the following four consecutive years. This is no doubt due to the inclusion of both cholera and cholera-like diseases in the monthly figures. Chance variations and faulty reporting detract from the value of the figures when the number of cases is small.

Since the great epidemic of cholera of 1919 with about 2,500 deaths out of 4,400 seizures, no outbreak of similar magnitude has been known for the last five years. But small annual epidemics occur even now in the coal-fields, and when such an event happens in a colliery it causes a great panic among the ignorant labourers, leading to their wholesale desertion and temporary closure of the affected colliery. As the question was so important from the industrial point of view, it was thought desirable to investigate it, and a small laboratory was opened at the Mudidi Hospital for facilitating our work. The accommodation for this purpose was obtained through the courtesy of Mr. Leach, Chief Mining Engineer of Messrs. Bird & Co., Calcutta.

The investigation was conducted partly out-of-doors in obtaining detailed histories of all cases reported as cholera through the office

of the Chief Sanitary Officer and in collecting blood and dejecta of such cases when available.

The work indoors consisted mainly in examining the faeces and blood of cases suffering or convalescent from suspected cholera and in routine examinations to detect carriers. Water samples from various sources were also examined to ascertain their connection with the sporadic or epidemic outbursts of the disease.

From the beginning of March practically to the end of July 1923, 250 cases were returned as cholera by the Health Office, Dhanbad,—the definition of cholera for such purpose being¹ "Every case of sickness accompanied by vomiting and diarrhoea shall be considered to be a suspected case of cholera." Of these I had the opportunity of investigating 45 cases, many of them in the acute condition. In Table No. I an abstract of the results of bacteriological examination of the faeces and blood of some of these cases is given. Along with the observations on acute cases, the faeces of 980 healthy persons were examined to detect cholera carriers among them, but no vibrios of any description were found, except in one case, where they were of non-agglutinating nature.

TABLE I.

| Total No. of cases examined. | Result of examination of stool for cholera V. | | No. of blood samples examined for Widal. | Reaction against | | REMARKS. |
|------------------------------|---|------------------|--|------------------|----------------|--|
| | Microscopical. | Bacteriological. | | V. Cholera. | B. Dys. Shiga. | |
| 21 | Nil. | Nil. | 12 | * Nil | Positive 5. | Agglutination at 1 in 20 and above was considered positive against Shiga's bacillus. |

* None reacted at 1 in 40 and above at the end of a week from the onset of the disease.

From the preceding table it is evident that in no case could cholera vibrios be isolated, and in no instance did the blood of a convalescent react against cholera. The apparent conclusion, therefore, is that the cases in the above series were not caused by the classical Koch's vibrio.

As regards the distribution of these cases, no evidence of grouping of any sort was obtained. As a rule they were very much scattered, often miles apart from one another, and when there were multiple cases in a colliery or village no association between individual cases could be established. Absence of multiple infection in the same household was, indeed, a feature of this group of cases.

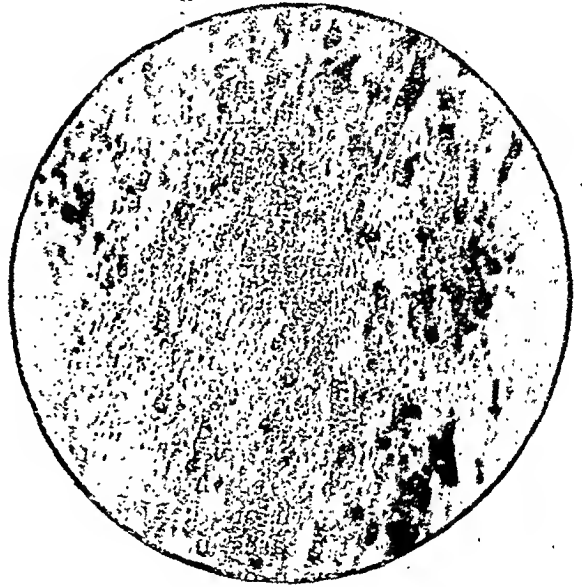
Clinically they resembled cholera and were of moderate severity. Apparently desperate cases responded remarkably well under kaolin treatment alone. Consequently the death rate was low, and there was little opportunity for post-mortem examination to study the nature of the pathological lesions. In one case, however, a partial autopsy was done immediately after death, and the lesions in the large intestine appeared to be a uniform congestion of the mucosa with points of sub-mucous hæmorrhage. The gall bladder was distended with liquid bile. The contents of the large intestine and gall bladder were negative both for cholera and dysenteric organisms. The intestinal exudate, fixed and examined fresh, showed a great preponderance of epithelial cells. They were mostly of columnar type with clumps of short rod shaped bacilli between them. The cellular elements in this respect simulated the picture of true cholera except that in the latter case the cells when stained do not come out so sharply and the field is usually found teeming with vibrios, *vide* Plate No. I where the two appearances have been depicted for comparison:

What are these cases then? The absence of comma vibrios, both in the smears and cultures of stools of acute cases, and the absence of multiple cases in the same household where the inmates do not observe the rudiments of personal sanitation, are points against cholera. The results of blood examinations in a few instances furnish some evidence of their being acute cases of Shiga infection and such cases have been mentioned by Rogers,² Cunningham,³ and Smith.⁴ But the absence of positive Shiga bacillus findings in cultures from clinically acute cases, even when the faecal specimens were obtained under ideal conditions and plated within an hour after they had been passed, raises a reasonable doubt as to the real nature of this group of cases. Hence the whole question has been left open for further investigation when opportunity presents itself in future.

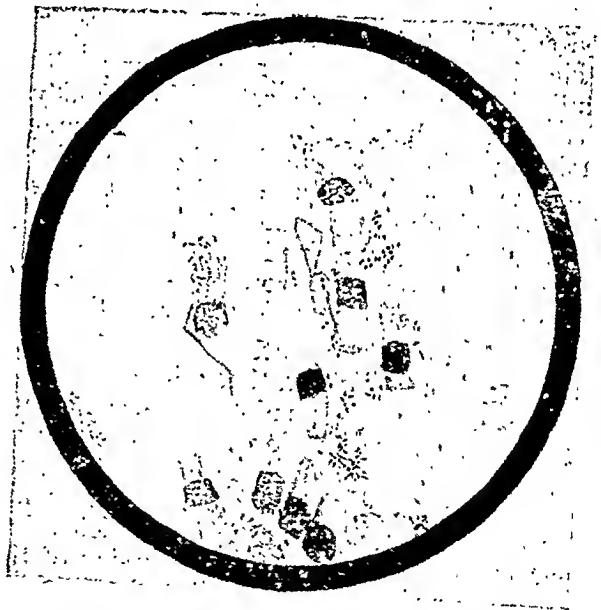
Towards the end of July 1923, 11 cases were reported in quick succession from a small village on the Grand Trunk Road, about 8 miles from Dhanbad. The camp laboratory was shifted to Gobindpore within two miles of the affected village, and the epidemic was fully investigated both clinically and bacteriologically from there. Altogether 18 seizures with 8 deaths occurred in this epidemic. By the time the observation centre was opened, 7 cases had already died. So the materials from the remaining 11 cases were examined bacteriologically and genuine cholera vibrios were recovered from 8 of them. The stools of 3 convalescents were culturally negative for cholera vibrios, but their blood re-

cholera at the end of the second week after the onset of the disease.

PLATE I.



(1) Microphotograph of a stained film of cholera stool.



(2) Microphotograph of a stained film of the stool of a patient with suspected cholera, who died in the Mudidin Hospital and on whose body a partial autopsy was done.

The sources of drinking water and batches of flies from the houses were examined as probable agents for spreading cholera, but nothing incriminating was found.

The history of the origin of the epidemic is interesting. One Santokh Das Babaji, a Hindu ascetic, had a fixed worshipping place in village Nero where the epidemic started. He had gone to Puri on pilgrimage during the car festival. Within a couple of days after his return from Puri he developed cholera. The epidemic was spread mostly by his disciples of the. Practically all the people who

had nursed Santokh Das, or had been in close association with him during his illness, developed cholera sooner or later, and carried the disease to their respective households. Three families were particularly affected in this epidemic, and there were in all 16 cases among them with 7 deaths.

The local sanitary authorities had in the meantime mobilized their personnel and adopted vigorous preventive measures which stopped the further progress of the disease. Two isolated cases subsequently took place in the adjoining village, but the infection was never allowed to spread, and the epidemic was controlled and completely stopped by the middle of August 1923.

Almost about the same time when the Nero epidemic was raging, a small and more or less localized outbreak was reported from Kirkend bazar, a place of commercial and industrial importance and situated midway between Jheria and Katrasgarh on the Jheria-Katras road. A group of 5 cases, more or less intimately associated with one another, was reported in 3 days. From the faeces of 2 of these cholera vibrios were isolated, the remaining 3 having died before the investigation could be taken up.

The 1st case in this group occurred in a family 5 days after their return from Baidyanath where they had gone on pilgrimage. Cholera vibrios were obtained in pure culture from the stool of this case. The next 2 cases died so quickly that materials for examination could not be obtained from them. There was a positive culture from the 4th case, but the 5th case also died before examination.

The Kirkend bazar outbreak was followed a few days later by a rather severe outburst of the disease in the Jamadoba Colliery belonging to Messrs. Tata & Sons. The first victim on this occasion was attacked on the day after the Mohurram festival was over, after his return from the usual gathering which takes place on the occasion of the immersion of the *tazias*. A number of cases followed, and from the materials obtained from 2 of these, cholera vibrios were isolated. Thus the epidemic in the Jamadoba Colliery was due to Koch's vibrio, and it is interesting to note that it closely followed the Kirkend bazar outbreak when the disease had already established itself in the centre of the Jheria coal-fields.

It is evident from last year's observations that cholera in the Jheria coal-fields is imported from pilgrim centres; this is probably the usual course of events from year to year.

Taking cholera to be an imported disease in the coal-fields, the preventive measures ought to be considered from two points of view:—

(1) Prevention of importation of the disease from pilgrim centres.

(2) Prevention of the spread of the disease when it has already established itself.

1. Prevention of importation of the disease:—

This is obviously impracticable, for not only convalescent carriers, but apparently healthy men who have imbibed the infection, and are in the incubation period of the disease pass from one part of the country to the other. Such sources of infection are more dangerous than others, as they are more likely to evade the most careful vigilance.

2. Prevention of spread of the disease when it has already established itself:—

This is more important and applicable to the local conditions. The machinery already exists in the Jheria coal-fields for this purpose, but there is ample scope for improvement. Notification of infectious diseases is compulsory in the coal-fields within 3 hours, but this is not strictly observed. Non-compliance with this standing order is due not so much to slackness on the part of the individual colliery authorities as to the ignorance and superstitious belief of the people themselves. Coercive measures are not likely to improve the present attitude. Persuasive methods on the other hand, by giving substantial rewards for early notification of cholera cases, are calculated to be more successful. In the case of individual collieries, labour contractors ought to take more interest in the health of the miners. At present these people, with very few honourable exceptions, are mainly concerned with the profits of the middle man and many of them make their fortunes in this way. There is no reason why they should not be made responsible for early notification of cholera cases occurring among their men. Next, methods of isolation and disinfection ought to be strictly applicable to genuine cholera with Koch's vibrio as the causative agent. It has been already recorded in the previous pages that a cholera-like disease with indefinite etiology is common in the coal-fields. Such possibilities ought to be excluded before recommending isolation (an unpopular step) and elaborate and expensive disinfection. And as correct discrimination between the two can only be done by careful bacteriological examination and clinical observation, a competent bacteriologist with a small staff and a mobile laboratory are necessary for the coal-fields.

Specific immunisation of susceptibles by subcutaneous inoculations is not likely to be popular with the labouring class, and its practicability cannot be assessed at present without further observations in India. Under suitable conditions it should be tried. Vaccination by the oral route is a possibility and an investigation into the value of this in intestinal infections is about to be carried out

in connection with this research; oral vaccination has apparently given good results in Russia and elsewhere, it is harmless and is likely to be acceptable to the people concerned. It should be tried, together with the preventive mixture found so useful by Dr. Tomb.²

SUMMARY.

1. A cholera-like disease with indefinite etiology exists in the coal-fields. Further investigation will be made of this important condition when opportunity offers.

2. This disease appears to be of low infectivity and was never seen to assume epidemic proportions nor to give rise to multiple cases in the same family.

3. Cholera epidemics due to Koch's vibrio were imported last year into the coal-fields from the pilgrim centres of Puri and Baidyanath.

4. Elaborate and costly disinfection measures are only justifiable when the outbreak is due to the genuine cholera vibrio, and as this can only be ascertained by careful bacteriological examination, a competent bacteriologist and epidemiologist with a mobile laboratory is a necessity for the coal-fields.

5. In the absence of a competent bacteriologist, all cases which have the clinical features of cholera must, of course, be dealt with as if they were true cholera.

6. The value of specific immunisation against cholera, both subcutaneously and by the mouth, cannot yet be assessed without further extensive trial, side by side with other methods of preventive medication.

7. The scientific method of prevention is not necessarily the best; the prejudices of the affected population and the local conditions must be taken into account.

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THE TREATMENT OF ASTHMA.

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Introduction.—In medicine there were axioms taught to us during our student days:

and one of them was that "if there were several drugs for the cure of a single disease, there was no real cure." The converse argument can also hold good, viz., if there are several drugs that really help in the cure of a disease, we probably do not know how and when to use them. That such a state of affairs actually exists in the treatment of asthma we will proceed to show in this paper. In 1923 we pointed out that asthma was not a disease, any more than dropsy or jaundice, but that it was a symptom-complex caused by various bases probably all derived from the proteins, some volatile and others non-volatile. As these bases all act through cell membranes (Acton, 1924), it was highly improbable that they are proteins with large indiffusible molecules, but are diffusible protein bases, e.g., polypeptides, etc. Moreover, they are not simple bases like methylamine, etc., as these have a very low toxicity, but are of a more complicated structure like adrenaline and tyramine, or tertiary nitrogen bases like the betaines and alkaloids. They are therefore intermediary decomposition products of proteins of a complex structure which are diffusible and toxic to animals.

The next point we had to consider was the question of individual susceptibility (Acton and Chopra, 1924), and here we found that it was largely correlated with the adrenal and thyroid functions of the animal. Again, when considering species variation we observed that it was associated with vagal or sympathetic predominance. In a more recent work on the subject, Bose and Acton (1924) in a preliminary paper have shown that the action of a base such as insulin is closely correlated with the colour of the animal, viz., albino rabbits are not sensitive, but black rabbits are very sensitive to the effects of insulin.

We therefore see that in these variations there are three groups in the different species of animals, as well as individual variations in the species:—

(a) Animals with high endocrine functions; e.g., the *Macacus rhesus* monkey and the albino rabbit: these animals resist the action of these bases, except when they cause a rise of blood pressure.

(b) Animals with moderate endocrine functions, e.g., the cat usually, and the brown Belgian hare rabbit; in whom the action of these bases is moderate in intensity.

(c) Animals with a low endocrine function, and these can be further subdivided into:—

(c₁) Animals with a low sympathetic endocrine function, sympathetic predominance; e.g., black rabbits and cats.

(c₂) Animals with low parasympathetic endocrine functions, parasympathetic nervous predominance, as shown by the high blood sugar, e.g., dogs.

The animals in the last group (c) fall into the category of sensitive individuals with sympathetic or vagal predominance, and this is correlated with variations in the species and colouration in the individuals. These variations are in general terms of susceptibility as regards race and colour. When we consider individual variations in the species, given favourable conditions, i.e., animals with a low adrenalin or insulin content, there is still another factor to consider,—the rate of diffusibility of the substance through the cell membrane.

Our recent experiments on the concentration of quinine and quinidine in the circulating blood—now in press—make this point quite clear. The enhanced toxicity of quinidine is due to its more rapid diffusion through the mucous membrane of the intestine, and to its greater adsorption by the tissue cells, and both these factors vary in the individuals under test. From a morphological standpoint we are led to the conclusion that both sympathetic (e.g.—trematodes, etc.) and parasympathetic nervous systems have a dual control, containing relaxor and constrictor fibres in each

In sympathetic predominance, owing to the deficiency in the amount of adrenalin, the cell permeability is increased and hence the pressor bases that stimulate the sympathetic are more diffusible, attain a greater concentration in the cell or at the nerve terminals and hence act more powerfully. In vagal predominance, owing to the deficiency in the amount of parasympathetic hormones, e.g., as shown by high blood sugar, the permeability is increased, and hence tertiary nitrogen bases that stimulate the vagus are more diffusible and so cause marked symptoms.

The causes of bronchial spasm and turgescence.—The first essential in the rational treatment of this symptom-complex is to find out the cause. In these persons we are generally dealing with a lower adrenal content in the blood than the normal, or with a lower insulin content. We can therefore classify these conditions of susceptibility into two main classes:—

(a) *Sympathetic predominance.*—In such individuals there is often a history of hereditary susceptibility, and the adrenal content is low. The causes of this condition may be due to:—

(A) *The animal group.*—Emanations from various animals, as well as the pollens of various plants may cause bronchial spasm. In the former these substances are almost certainly volatile bases, and in the latter are soluble diffusible bases that enter through the conjunctival or mucous membrane. In India; hay fever is very rarely seen, except in hill stations when it is due to the pollen of the

deodār. These attacks may be of nightly occurrence if the animal lives in the house; irregular, as when the patient visits a friend in the house or is benefited by a change of residence; seasonal, with pollens, or by using say an eider-down quilt in the winter. We can quote a case where we found a lady to be very sensitive to eider-down, and advised her to present her quilt to her mother. After following our advice she has been practically free for two years. From the history and the dermal tests these cases can now be readily diagnosed in the laboratory. The obvious thing to do by way of treatment is to avoid the particular animal or pollen if possible, or to desensitise the patient by injections of the particular poison (see the *Indian Medical Gazette* for May, 1924, paper by Dr. A. R. J. Douglas).

This case was diagnosed by us as being sensitive to the horse and cat by the epidermal tests. She could live perfectly free from asthma in Ceylon, because there is practically no horse traffic there, and bullock carts, rickshaws and motors are the usual methods of transport. In Calcutta her lungs were full of expiratory rhonchi but there were no definite asthmatic attacks, as there is only a fair amount of horse traffic on the streets. In the district where her husband lived there was practically nothing but horse transport, and day and night she was subject to asthmatic attacks. Six months after desensitisation, she came down to a hotel and slept next to a lady who kept a number of cats and she got another attack. As we have not heard from her since, we conclude she must be still free from asthma.

(B) *The food group* can in a similar way lead to a daily attack, if the asthma is due to some common food; irregular, if it happens to be a food which is only taken occasionally; seasonal, when the article of diet has a seasonal variation, e.g., mango, fish, etc. Occasionally this condition may be associated with disease in the bowel (Acton and Knowles 1924), as in *Entamoeba histolytica* carriers, when the digestion of the proteins is not properly carried out by crepsin. Here again the avoidance of the particular food is indicated, if it is possible; otherwise the indication is to increase the resistance of the patient by endocrine administration; by injections of arsenic (soamin); or the treatment of the bowel condition. In this group the eosinophile count is always very high.

(b) *Vagal predominance.*—In these individuals there is often no history of heredity, as the condition is generally due to the various bacterial infections of the respiratory or other parasympathetic areas. The adrenal content is often fairly high, but these individuals are very sensitive to bases like pilocarpine. The causes of this condition may be due to:—

(B₁) *Some irritation in the area supplied by the vagus nerve.*—Here the mental factor is of great importance, the so-called nervous asthma. The case that is often cited in support of the nervous theory is the occurrence of asthma in a lady who was sensitive to rose pollen, and who used to get asthma after smelling an artificial rose. The irritation in this area may be due to such trivial causes as vibrissæ at the nasal orifice. Thus it may be due to various nasal and pharyngeal defects; bronchitis, and development of sensitiveness to various causative micro-organisms; after pneumonia and then due to the pneumo-bacillus or pneumococcus. More rarely it is seen with pulmonary tuberculosis, but very commonly indeed with enlarged bronchial glands of tubercular origin. The obvious thing to do is to correct any nasal defect, to remove the irritation, and so render the patient less liable to attacks of nasal catarrh and its extension into the bronchi. Also to increase the general resistance, by tuberculin, or by vaccines made from the causative organisms; as well as by general treatment, fresh air and giving plenty of live animal fats and proteids, as these increase the endocrine defence mechanism.

(B₂) *Stasis of decomposition products in the blood*, such as carbon dioxide, etc., which occurs in cardiac asthma and in the asthma seen in a failing renal heart. In true renal asthma the bases act more powerfully on the sympathetic. In all these conditions of stasis, unless it can be overcome by the ordinary treatment of cardiac tonics, e.g., digitalis, nux vomica, strychnine, or by diuretics and purgatives, only temporary relief can be obtained by the drugs that act centrally, e.g., morphia, or through the vagus as with the nitrites, etc.

The majority of cases, however, are not simple cases of predominance of the vagus or sympathetic nervous system, but in 70 per cent. of the cases they are mixed in character. Thus in a case of sensitiveness to a particular food, the repeated attacks of asthma render such a susceptible person more liable to attacks of bronchitis, and this in its turn leads to the development of sensitiveness towards the causative bacteria. Again, the irritation by vagotonia produces asthma and ill health, then perhaps a sensitiveness develops towards some foodstuff. Nasal defects predispose to nasal catarrh, and this in turn to susceptibility towards the various causative organisms.

The treatment of asthma.—Having discussed fully the various causes of this symptom-complex, we are now in a better position to understand its rational treatment by the various drugs enumerated in the textbooks as being useful in this condition. We

can best describe them under the following headings:—

(a) *Treatment during the stage of attack.*—The drugs that act through the central inhibitory centre of the vagus; these are all useful, viz., ether, chloroform, chloral hydrate and morphia, but they act without removing the cause. Their use is only justified in conditions like cardiac failure due to heart disease or renal disease, when the toxic stasis cannot be removed by other drugs, and the patient's days are numbered. The use of these drugs is extremely dangerous owing to the formation of drug habits, and they had better be avoided altogether, because we are not removing the cause of the symptoms, but merely using them as a placebo to relieve symptoms.

(A₁) *In sympathetic predominance* the action of adrenalin is best seen, for it markedly dilates the bronchial muscle with practically no action on the heart. Doses of two to five minims injected intramuscularly or intravenously are well tolerated and the effects are almost instantaneous, and owing to its inhibitory action on these bases the effect lasts a long time. In this category one could mention lobelia, which has an action like nicotine, and paralyzes the sympathetic, so it is sometimes useful when smoked as a cigarette. Another drug that has a limited use is tyramine. Adrenalin fulfills our requirements, as tyramine, although its effects on respiration are more prolonged than those of adrenalin, does not inhibit the action of the bases.

(A₂) *In vagal predominance* on the other hand, adrenalin when injected intramuscularly has only a slight and evanescent effect in overcoming the bronchial constriction caused by these bases acting on the vagus. Doses as large as five minims of adrenalin hydrochloride often cause a very high rise of blood pressure and irregular action of the heart. For these reasons, vagotonic individuals generally object to injections of adrenalin. The drugs that are preferred by them during the acute attacks are the phenacetin group which act on the algesic centres and cause vaso-dilatation of the vessels, thus relieving turgescence. The nitrites, e.g., amyl nitrite, nitroglycerine and sodium nitrite, give great relief in the failing renal heart and in cardiac failure. Lastly, the value of atropine and cocaine when given as a fine spray is very great, for both paralyze the vagus and lessen bronchial secretion. The same result is brought about to a lesser degree by inhaling the fumes of stramonium as cigarettes or when these drugs are burnt in an open pan.

As vagotonia is more common than sympathetic predominance, it is for this reason that the various so-called proprietary asthma cures, viz., the preparations of stramonium and nitre as cigarettes or inhalations, the

inhalation of amyl nitrite, the fine spray of atropine and cocaine, hold their sway over these patients and find a large and continuous sale. As long as the exciting cause is not removed, all these drugs are only methods of treating the condition symptomatically.

(b) *Symptomatic treatment between the attacks.*—This is often advisable in order to give relief during carrying out of the necessary examinations for finding the cause, or when increasing the resistance of the individual.

(B₁) *In sympathetic predominance* the difficulty is usually owing to the viscosity of the sputum, for the oedema of the mucous membrane hinders the secretion of the mucous glands and so expectorants, especially potassium iodide in small doses (grs. iii) and others, relieve this condition. Lobelia is given as tinct. lobelia ætheris m. xv., as lobeline paralyzes the sympathetic, like nicotine. In such cases the following prescription can be given:—

| | | | |
|-----------------------|----|----|---------------|
| Potass. iodide | .. | .. | grs. iii. |
| Tinc. lobelia ætheris | .. | .. | m.x. vel. xv. |
| Sodii bicarbonas | .. | .. | grs. x. |
| Sodii chlor. | .. | .. | grs. x. |
| Sp. chloroformi | .. | .. | m.x. |
| Aq. anethi | .. | .. | ad. oz. i. |
| | | | t.d.s. p.c. |

(B₂) *In vagal predominance* there is generally increased expectoration, and the belladonna group in full doses diminish secretion and paralyse the nerve endings of the vagus. With belladonna we can combine bromides, and in such cases the following prescription can be given:—

| | | | |
|-------------------|----|----|----------------|
| Pot. bromide | .. | .. | grs. v vel. x. |
| Borax | .. | .. | grs. ii. |
| Tinct. belladonnæ | .. | .. | m. iii to v.* |
| or | | | |
| Ext. Kuth radix | .. | .. | dr. i. |
| Sp. chloroform | .. | .. | m.x. |
| Aqua | .. | .. | ad. oz. i. |
| | | | t.d.s. p.c. |

* These cases are often sensitive to belladonna.

Chopra 1924 has found the extract of Kut root to be very efficacious in these cases.

In a few cases associated with tubercular or streptothrix cavitation of the lung, benzyl benzoate 15 mins. as a 20 per cent. solution in alcohol has given good results in preventing these spasms.

(c) *The cure of asthma, or the prevention of attacks.*—The first essential thing to do is to find and remove the cause, and failing that to increase the defence mechanism.

(C₁) *Remove the cause.*—In the sympathetic group this is more easily done, for the animal or food responsible can usually be detected by the dermal tests. Curious mistakes have occurred in our experience; one patient we found was sensitive to wheat, so all bread was cut off from his diet, yet the asthmatic attacks continued; it was not until we more carefully

investigated his diet that we elicited the fact that in the hospital diet *suji*, a wheat preparation, was also given to the patients. In a second case, the patient was found sensitive to *rohu* and *hilsa* fish; he was given no fish in his diet, but was ordered meat curry and rice. Still the asthma continued, and on careful watching the nurse found that he used to ask the cook to help him to a spoonful of the gravy of the fish curry because the meat curry was dry. In a third, the patient was insensitive to milk proteins: in this case the disease was urticaria and he invariably got his rash between 2 to 4 p.m. These bases take about 6 hours to get into the circulation and the incriminating meal was thought to be breakfast. Here we found that at breakfast he had curdled milk every morning and when tested with it gave a very marked reaction by the dermal test, but was insensitive to fresh milk and was cured by eliminating this article from his diet. With a dermal reaction to many food substances we found these cases sometimes to be associated with *E. histolytica* infections. In vagotonia as a rule this is not possible because most cases are due to tubercular glands. Sometimes removal of the nasal disease may eliminate the source of irritation, or diminish the predisposition to nasal catarrh and its subsequent spread to the bronchi. In others the treatment of the enlarged tubercular glands by rest, diet, a healthy climate, and injections of very small doses of tuberculin with secondary vaccines has given great relief.

(C₂) *Increasing the internal defence mechanism.*—In sympathetic predominance we have often found that it is due to deficiency in the thyroid and adrenal secretions. Oliver considers that orchitic substance is also necessary because it oxidises the protein bases into less toxic substances. We first inject m. ii. of adrenalin hydrochloride intramuscularly twice a day for a few days, and then follow it up with the following endocrine extracts by the mouth:—

| | | | |
|------------------------------|----|----|----------|
| Extract orchitis vel. ovarii | .. | .. | grs. ii. |
| Ext. suprarenalin | .. | .. | gr. i. |
| Ext. thyroideum siccum | .. | .. | gr. ½ |

Sometimes iodides are useful, and act by supplying the necessary iodine to the thyroid as well as by increasing the expectoration. In the food group, soamin has been shown by Dr. B. N. Ghosh to be useful. We know that arsenic stimulates all assimilative processes, and its excretion in the small and large intestine probably increases the amount of erepsin and so helps to break down the more complex toxic bases into simpler non-toxic bases. When several essential foods produce marked dermal reactions, these are the only possible methods to use, as one cannot eliminate three or four essential foods like milk, flour, eggs and fish from the diet.

In vagotonia there is usually a high blood sugar content, with or without a high amount of adrenalin in the circulating blood. The pulse is often slow with a high blood pressure. Oliver found the anterior lobe of the pituitary gland to be more useful in cases with high blood pressure with a slow pulse. Injections of vaccines raises the immunity the individual against the various infective organisms of the lung or nasal mucosa, but as these persons are sensitive great care should be taken about the proper regulation of the dose of the vaccine. The majority of cases do better if the dose of vaccine is kept very small, for it is rarely necessary to exceed 0.5 c.c. or 50 to 500 million organisms for toxic and non-toxic strains, or 0.000,000,01 milligrammes per c.c. of T.B.E. in cases associated with enlarged tubercular glands.

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THE MIGRATION OF HOOKWORM LARVÆ IN SOIL.

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(Contribution from the Hookworm Research Laboratory, Calcutta School of Tropical Medicine—Jute Mills' Association Endowment).

IN spite of the great amount of interest which has been aroused in hookworm disease in the past thirty or forty years, it is a rather remarkable circumstance that very little really accurate knowledge concerning the free-living life of hookworm larvæ in the soil was available up to three years ago, notwithstanding the vital importance of such knowledge in connection with the scientific control of one of the greatest of human scourges.

Up to 1922 it was the prevalent opinion that after hookworm larvæ had developed to the infective stage and had established their life in soil, they were essentially migratory, and could live for very long periods of time. Dock and Bass (1913), for instance, in their book on hookworm disease, say: "if the temperature is not too low they have a strong tendency to migrate, and especially to crawl up on all sorts of objects kept moist by water."

Nicoll (1917) states that hookworm larvæ can travel through moist soil at a rate of probably not less than five feet per hour, so that, in the course of 24 hours, they may have wandered 40 yards. In my own book on "Animal Parasites and Human Disease" (Chandler, 1922) this statement is quoted and the following comment made:—"While such continuous travelling in a straight line would probably never occur, it is evident that a single infective stool would easily be able to infect the ground for several square yards."

As regards their life span in soil the prevalent conception, until recently, can be illustrated by a quotation from Nicoll (1917). He says "these larvæ when they reach this final stage have ceased to feed, and they can remain alive for months or even years under suitable conditions, i.e., where there is a sufficiency of moisture and not too great heat. In the laboratory they have been kept alive for over 18 months in plain water, at a temperature of about 60°F. It can hardly be doubted that they will live fully as long under natural conditions, unless it be that they are attacked and devoured by other animals, such as aquatic insects."

With the discovery of an efficient method for extracting hookworm larvæ from soil by Baermann (1917) and its improvement by Cort et al. (1922) it became possible to study more accurately the activities, distribution and life of hookworms in the free-living state. In 1922 and 1923 the results of a number of experiments carried out in Trinidad and Porto Rico were published which indicated that our former ideas on these points were quite erroneous. These experiments, in brief, showed that lateral migration does not occur on moist soil, even to the extent of migration to favourable situations when the original environments become unfavourable, but that larvæ are readily carried out from centres of soil infestation by surface water and become established in new places, and that they are readily transferred from place to place by mechanical means, e.g., by soil adhering to boots, etc. (Augustine, 1922a). The absence of any appreciable lateral migration was also observed by Cort and Payne (1922) on a sugar estate and on a cacao estate in Trinidad. It was further shown that, under favourable conditions of moisture and temperature, the larvæ remain on the surface of the soil or very close to it, climbing up on wood, dead vegetable matter, etc., only as far as the film of moisture extended, but not climbing up into the drops of water collected in the axils of leaves of living plants (Augustine, 1922b). Hirst (1924) observed that larvæ placed in an incubator at 37° C. receded into interstices of soil, reappearing and extending themselves from the surface a few minutes after exposure to room temperature. The writer has also

observed this phenomenon when larvæ on the surface of soil were warmed by a Silverman opaque object illuminator attached to a microscope to watch their movements.

As regards vertical migration of buried larvæ, on the other hand, it was found that larvæ under field conditions would migrate in large numbers through at least 36 inches of sandy loam soil, whereas the migration is to a large extent inhibited by fine or clayey soil. In pure clay, migration from a depth of only six inches was unsuccessful. On a wall of soil, however, such as the side of a pit latrine, few larvæ were found above the level of inoculation (Payne, 1923a). Experiments and observations also indicated that migration does not begin until the larvæ have reached the infective stage, that it is stimulated by increase of temperature, that young larvæ show greater activity than old ones, and that the direction of movement is oriented, in part at least, by the movement of the water film over the particles of soil (Payne, 1923b). Rising ground water would, therefore, lead to an upward migration.

As regards length of life of hookworm larvæ in soil under natural conditions, Augustine (1922c) found that a rapid reduction in numbers occurs, and that the extent of their life, under tropical conditions, is limited to about 6 or 8 weeks. Baermann (1917), however, kept larvæ alive in soil for 6 months in Sumatra, and Hirst (1924b) kept them in soil for 4 months in a laboratory in Ceylon during the cool season. The earlier suggestions of Leuckart (1868) and Looss (1911) that the duration of life is directly dependent on the conservation or exhaustion of the stored food granules in the intestinal wall, since the infective larvæ do not feed, were supported by Augustine, who found that environmental conditions such as tropical temperatures, which tend to increase the activity of the mature hookworm larvæ, will shorten their lives by the more rapid using up of the stored food material. The energy necessary for migration has definitely been shown to cause a rapid exhaustion of this reserve food supply, with a consequent shortening of life.

So revolutionary are the conclusions drawn from this work as regards the activity and viability of hookworm larvæ in soil that many workers have hesitated to accept them. It has been suggested to the writer by several eminent parasitologists that there may have been errors in this work, and that the apparent failure of migration and rapid mortality of the larvæ in soil was due in reality to a speedy scattering and consequent "dilution" of the larvæ to such an extent as to make their destruction rather than their migration appear as the explanation.

It seemed worth while, therefore, to test the conclusions reached in Trinidad and Porto

Rico by experiments which would preclude the possibility of the escape of the larvæ by migration. To do this we constructed some large funnels one and a half to two feet in diameter at the top, fitted with burettes underneath. These funnels were filled with water, and circular wooden trays, cut out to a depth of $\frac{3}{4}$ inch and having a narrow rim, were floated on the surface. The trays were lined with absorbent cheese cloth, hanging over the edges into the water at intervals, in order to absorb moisture. Soil was placed on the trays to a depth of one inch, and it was found that any desired degree of moisture could be maintained by regulating the number and size of the overhanging strips of cloth. Five thousand to 10,000 hookworm larvæ were placed on areas of $\frac{3}{4}$ inch diameter at the centres of the discs. In case the larvæ migrated to the edges of the discs they would fall into the water and could be collected from the burettes at the bottom. Water was drawn off and examined at intervals of two or three days, but no hookworm larvæ were ever found, although numerous soil nematodes were collected. At the end of from one to two weeks the soil on the discs was cut into concentric rings and examined from the periphery toward the centre. Four such experiments were carried out, two with each disc. In three of these experiments no larvæ were recovered at a distance of more than $1\frac{1}{2}$ inches from the area of inoculation, and from 75 per cent. to 95 per cent. of those recovered were found in the actual area of inoculation. In one experiment, however, larvæ were found all the way to the periphery of the disc, but in this case the soil was not kept moist automatically, but by daily sprinkling of water on the surface. Although this sprinkling was done with special care to avoid the washing of larvæ from place to place, it is evident that even gentle sprinkling was sufficient to spread the larvæ to a very considerable extent, and that a very slight trickling of water over the surface of soil is sufficient to scatter them.

Another experiment was performed to simulate conditions on a hill-side. One of the discs was sloped at an angle of about 20 degrees, and another at an angle of about 30 degrees, both being kept moist by allowing a very slow stream of water to seep through the soil from the upper side of the disc. At the end of ten days these discs were likewise cut into concentric rings and examined, the upper, lower, left and right quadrants of the rings being separately examined. The soil in these experiments was kept in a saturated condition by the slow flow of the water across it. On the disc sloped at about 20 degrees a total of 15.2 per cent. of the larvæ were recovered; 78.4 per cent. of these came from the area of inoculation, 9 per cent. from the upper quadrant of a ring two inches wide

around the area of inoculation, 6.6 per cent. from the lower quadrant of this ring, and 2.5 per cent. and 3.5 per cent., respectively, from the right and left quadrants; no larvæ were obtained from any of the more distant rings. On the other disc, sloped at 30 degrees, a total of 42.8 per cent. of the larvæ were recovered, 96.93 per cent. of these from the original site of inoculation plus an area of $\frac{1}{4}$ of an inch around it; 1.84 per cent. from the lower quadrant of the next zone of $1\frac{1}{4}$ inches in width; 0.36 per cent. from the upper quadrant of the ring; 0.19 and 0.64 per cent. from the right and left sides respectively, and 0.04 per cent. (2 larvæ) from the lower quadrant of a zone $1\frac{1}{4}$ to $2\frac{1}{2}$ inches from the area of inoculation. It is evident, therefore, that seepage of water down over a sloping hill-side is not instrumental in inducing hookworm larvæ to migrate either upwards or downwards.

As regards vertical migration, fæces containing numerous hookworm larvæ were buried under 12 to 24 inches of soil in cylinders having a diameter of $2\frac{1}{2}$ inches. Some of the tubes were moistened from below by standing in water, others were moistened from above by pouring water on the surface. The effect of wetting the soil to a depth of about two inches with weak chemical solutions, such as chloride of lime, copper sulphate, phenyl, etc., was also tested. So few larvæ ever reached the surface in any of the tubes, however, that the differential results were not conclusive. Evidently there was some factor present in this experiment different from those in the field experiments in Porto Rico. Further experiments along this line have been planned.

The vertical migration of larvæ was also studied in glass tubes by direct observation. The tubes were partially filled with dry soil, the larvæ then placed in the tubes with a minimum of water and dry soil placed on top of them to depths of from four to six inches. In tubes in which water was absorbed from below and which consequently had an upward movement of the water films over the particles, the upward migration was very rapid, a few of the larvæ keeping abreast of the rising moisture, but most of them remaining a little distance behind it. The larvæ after half an hour were well scattered from the point of inoculation to the top of the column of soil; none were seen below the point of inoculation. None of the larvæ were observed to climb steadily upward. They moved forward, sometimes as much as $\frac{1}{4}$ inch in a minute, then stopped, and moved sideways and even backwards at times, but the general tendency was invariably upward.

In tubes in which the water was allowed to seep down from above, the movements of the larvæ were very confused. The majority continued to swarm near the level of inocula-

tion for a long time, some moving upward and others downward for distances of about an inch in the course of an hour. It was obvious, however, that the downward seepage of the water had no such effect in directing the migration as had the upward seepage. These tubes were left overnight without more water being added, and in the morning all the larvæ which could be seen were at the top of the column of soil. It is reasonable to conclude from these experiments that larvæ buried in soil are not guided upward merely by an upward flow of ground water as the result of surface evaporation, as was suggested by Payne (1923b), but that they have a definite negative geotropism. An upward flow of water affords very appreciable aid to them, whereas a downward flow retards their progress to such an extent as to neutralise it and prevent migration. The effect can be compared to the help or hindrance afforded to a swimmer by a river current, according to whether he is swimming with or against it. The failure of the larvæ on a sloping disc to migrate with the water seepage is further evidence that the water flow has little or nothing to do with migration.

As regards the migration of larvæ on the side of an earth wall, e.g. that of a privy, which is a matter of great importance, our experiments confirm those of Payne (1923a). We lined the bottom and sides of a petrol tin with soil to which enough clay was added to make it firm. Small holes were bored through the soil from top to bottom in the corners of the tin, and filled with absorbent cotton. By saturating these tubes of cotton with water it was possible to keep the entire soil wall of the tin moist. Fæces containing abundant hookworm eggs were placed in the bottom of the tin, at a depth of from ten to twelve inches from the top. Two weeks and three weeks later the surface of the soil around the top of this imitation latrine was carefully scraped off and examined for larvæ. Out of about 1,000,000 possible larvæ, only seven were obtained from these surface scrapings. Charcoal cultures made from the same stools yielded an abundance of larvæ, and large numbers were obtained from the level of inoculation in the tin. In another experiment some pits $2\frac{1}{2}$ inches in diameter and 10 inches deep were made in soil in a petrol tin, and fæces estimated to contain over 200,000 eggs placed in the bottom of each. At the end of two weeks the soil on the sides of the pits was scraped off at different levels into a little receptacle, the diameter of which was equal to that of the pit; and which could, therefore, be lowered by a wire into the pit and the surface of the wall above it scraped off so as to fall into it. From $7\frac{1}{2}$ inches to 10 inches above the level of inoculation no larvæ were recovered in any of the pits; from 5 to $7\frac{1}{2}$ inches above,

only 3 larvæ in each of two pits were obtained; from $2\frac{1}{2}$ to 5 inches above, from 3 to 26 larvæ were obtained in different pits, a total of 54 in all four; whereas in the lower $2\frac{1}{2}$ inches and bottoms nearly 10,000 were obtained. The reason for the unusually high mortality in this experiment is not known, since abundant larvæ developed in cultures from these fæces.

To further test this point, soil was scraped from the surface margin of several simple pit latrines which were in constant use in coolie lines on a tea estate in the Darjeeling District where hookworm is known to be prevalent. Not a single larva could be recovered from these scrapings, although the surface of the pit was only about $2\frac{1}{2}$ feet from the surface of the fæcal material contained in it.

It is evident from these experiments that migration on a soil wall such as the sides of a simple pit latrine must be practically nil. Payne (1923b) thinks this is due to an alteration in the flow of ground water, the latter flowing towards the walls of the latrine as well as upwards, as evaporation takes place. In the light of our observations on the effect of the flowing of ground water, however, this explanation does not appear satisfactory. We can, however, offer another possible explanation which seems more probable. We may presume that such larvæ as are not destroyed by lack of oxygen in the centre of the fæcal mass do begin to climb upward toward the surface of the latrine, but that before they have proceeded many inches they climb to the top of some projecting soil particle and remain there, awaiting an opportunity to enter a host, unaware that the entire journey to the top has not been completed. If this is true, it is a fact which is of very considerable practical importance. Further experiments both in the laboratory and in the field are planned to throw further light on this question.

SUMMARY.

The above experiments confirm the conclusions reached by Augustine, Cort and Payne concerning (1) the practical non-existence of lateral migration of hookworm larvæ; (2) the easy scattering of larvæ by surface water; (3) the tendency to upward migration through coarse soil; and (4) the very restricted migration on the sides of a soil wall. Our observations, however, point to a definite negative geotropism as the principal factor in guiding larvæ upward, rather than an upward flow of surface water, as suggested by Payne.

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THE CURE OF SCHISTOSOMIASIS BY THE INTRAVENOUS INJECTION OF ANTIMONY TARTRATE.

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UNDER the title "Experimental Studies in Bilharzia Therapy (*S. spindalis*)," Dr. Hamilton Fairley, in the August 1924 issue of the *Indian Medical Gazette*, published details of a comparative investigation of the action of antimony tartrate and emetine on goats experimentally infected with *S. spindalis*. Dr. Fairley found emetine superior to antimony tartrate as a specific cure for the goats and wrote:—"It will be very surprising if the superiority of emetine hydrochloride does not hold for the human types of schistosomiasis as well."

The method of action of Tartar Emetic in Bilharzia.—In the preliminary sketch giving some details of the antimony tartrate treatment of bilharziasis, Dr. Fairley re-states his original view that antimony does not kill the Bilharzia ova deposited in the tissues, and is of opinion that the

cessation of ova in the urine during treatment is best explained by the temporary sterilization of the worms, the drug acting on the "generative organs of the adult schistosomes." This view it appears has little basis in fact to corroborate it. Dr. Fairley also considers that temporary sterilization of adult worms accounts for the number of cases in which, after treatment, ova have reappeared (in other words "relapses").

References not up-to-date.—The dates of the references which Dr. Fairley gives indicate that he may not have seen all the writings published in 1922, but one in 1923, and none in 1924: for instance, of H. B. Day (1924), of the several Egyptian doctors who have made official reports on the antimony treatment in the six Egyptian Government Hospitals where Bilharzia annexes have been established to carry out the treatment, of F. O. Lasbrey and R. B. Coleman (1924), of F. C. Cawston (1923 and 1924), and most recently of E. C. Faust at Peking (1924).

These are chiefly clinical studies, but their independent work and general agreement are, I think, more reliable than conclusions which cannot so safely be drawn from work done experimentally with a substitute host, and with a parasite of different species to human schistosomes.

Well known workers have advanced the opinion, on logical grounds, that the cessation of ova in the urine during the treatment of bilharziasis by antimony tartrate is due to the direct action of the drug on the ova (miracidia) deposited in the tissues. In the anterior end of the miracidium are head-glands which, according to this view, secrete digestive fluid which penetrates the blunt permeable end of the ovum, and dissolves the tissue ahead, making the progress of the ovum towards the lumen of bladder or rectum possible, not an inherently improbable view, for cercariae are held to have the same mechanism for their passage from the skin into the blood vessel of the host.

H. B. Day, late Professor of Clinical Medicine at Kasr-el-Aini Hospital, Cairo, maintains that not only are Bilharzia ova in the tissues killed by antimony tartrate, but that only a very small dose of antimony is required to kill the ova already deposited ($2\frac{1}{2}$ grains), that the reappearance of ova in the urine after small doses is due to the fact that enough antimony tartrate has been given to kill the ova but not the adult worms, which have only been temporarily inconvenienced by the lesser dose and require a stronger concentration of antimony in the blood to kill them than the ova require. Injections of antimony tartrate are certainly followed by the appearance of dead ova in the urine, and later by the disappearance of the ova from the urine. Where are they killed? Not in the urine, for undiluted urine does not penetrate the ovum. Not in the parent worm, for this would postulate the female schistosome laying addled eggs. They can only be killed in the tissues where they have been deposited.

If such a secretive apparatus as that described above were paralysed, the ovum would remain where it was, for its automotor mechanism would be destroyed, that is few ova would appear in the urine. This view, which has much to support it, was first enunciated by R. T. Leiper in 1919.

Explanation of relapses.—With regard to so-called "relapses" after antimony tartrate in human Bilharzia disease, they are due in uncomplicated cases, practically all of them,* it may be, to want of skill or it may be lack of judgment with regard to dosage on the part of the person who administers the drug. If you give enough antimony you do not have relapses, if you don't give enough you have relapses ("failures"). 25 to 30 grains appears to be the human adult dose (total), and there are very few uncomplicated cases of bilharziasis which require more to completely cure them.

F. O. Lasbrey with an experience of 4,600 injected Bilharzia patients says:—"Failures are always due to the patient not having had the full course." The Egyptian doctors working in the Bilharzia annexes of the Government Hospitals estimate the percentage of successes, in cases treated with antimony tartrate and taking the full course, at over 90 per cent.

Now I think experimental work is liable to failure for the same reason as clinical. Dr. Fairley infected with Bilharzia (*S. spindalis*) 19 goats.

"In 11 out of 19, tartar emetic definitely 'failed to cure'; in 5 complete cure was established." To some he gave 13 injections and to others as many as 45, the total amount of antimony tartrate given varied between $7\frac{1}{2}$ grains and $25\frac{1}{2}$ grains.

Dr. Fairley does not state that he worked out the toxic dose for goats, and in point of fact he appears to have used a very small maximum dose ($4\frac{1}{7}$ grain).

Now it is important that the antimony tartrate should be in such concentration in the blood as to kill the worms. We are completely in the dark regarding the following points:—

(i) The toxic dose for goats. I suspect that a goat would stand more than $\frac{1}{4}$ grain.

(ii) How many injections did each of the 11 failures receive? Injections varied between 13 or 45 it appears.

(iii) Did the 11 failures receive a total of $7\frac{1}{2}$ grains or $25\frac{1}{2}$ grains, or some number between $7\frac{1}{2}$ and $25\frac{1}{2}$ grains?

It is impossible to accept Dr. Fairley's conclusions even with regard to *S. spindalis*, without knowing these details of administration. Whether he is justified in drawing a general conclusion regarding human Bilharzia from the labora-

* It is admitted that certain persons having an idiosyncrasy cannot take antimony tartrate. There are also cases too feeble to take it and certain cases where veins are not easily found. The total of all cases which cannot take antimony is small.

tory experiments with *S. spindalis* is dealt with later.

A personal opinion.—With an experience of over five years with the treatment in England, I state with confidence that my only "failures" have been due to idiosyncrasy of individual cases not permitting the full course to be given; failures have been few (1 or 2). (In England the serious complicated cases of Egypt were not met with, but serious complications only interfere with cure by antimony in so far as they prevent full courses of antimony from being given.)

Apparently cured cases really "failures."—Cases of apparent cures, Dr. Fairley suggests, are "frank clinical bilharziasis" converted into "passive carriers." There appears to be no evidence for the truth of this statement. Mr. N. H. Johnson and the writer during the last four years have had over 150 (injected) cases under observation at the Ministry of Pensions in London and have periodically searched the urine after treatment for ova in each case. In none of those who took a complete course of injections (25 to 30 grains) have living ova returned.

Methods of diagnosis of active Bilharzia.—An experienced laboratory assistant, accustomed to examine Bilharzia urine (and Bilharzia faeces), is able to give a reliable report as regards active Bilharzia infection. The complement fixation test is not infallible, and a cured Bilharzia case will give a positive reaction for a considerable time after completion of the course (and the cure). The complement-fixation test is not yet a practical proposition in the treatment of bilharziasis.

Details which are required from writers reporting "relapses."—Writers publishing "relapses" after antimony injections should always give details of methods adopted, particularly details of dosage, including intervals between single doses, for it is only with such knowledge that a reader can judge whether the recurrence is due to failure of the antimony or to the inexperience of the doctor.

Writers frequently record "failure" after 1½ or 2 or 10, or 15 grains. It would be equally logical to condemn castor oil as a "failure" because a teaspoonful failed to give the required result.

Dr. E. C. Faust's experiments.—Faust recently (1923) made some noteworthy experiments in Peking. He showed that Bilharzia worms in vitro were killed instantaneously in a solution of 1 in 600 antimony tartrate; whilst dilutions of 1 in 42,000 killed in 60 mins.

If these findings are confirmed, the direct action of antimony tartrate in the case of Bilharzia adult worms must be admitted. Incidentally Faust observed also that the worms appeared to die from the posterior end forwards.

Dr. Fairley's theory of the action of antimony tartrate picking out the generative organs of Bilharzia does not appear to be supported by Faust's experiments.

Dr. Fairley's experiments.—With regard to the experiments with antimony tartrate on *S. spindalis* in goats, if it is true that antimony tartrate is less toxic than emetine to *S. spindalis*, in Fairley's cases antimony proved less toxic than emetine to the goats, for the emetine killed three goats. This corresponds to experience in human schistosomiasis. Emetine with its liability to complications, cardiac depression and peripheral neuritis, is more toxic to the "host" than antimony tartrate.

Clinical investigations recorded support antimony tartrate versus emetine for Bilharzia.—Investigations were as a fact carried out (1923) at the Kasr-el-Aini Hospital to determine the relative value of antimony tartrate and emetine in human Bilharzia disease, and the conclusion arrived at was that emetine was *not* as efficient as antimony tartrate in human bilharziasis. Emetine has also the disadvantage of being considerably more expensive than antimony tartrate, and it must be remembered that there are millions of Bilharzia sufferers waiting for treatment in Africa and 10,000,000 in China; the price of emetine makes it prohibitive for mass treatment.

It is not easy to carry on clinical investigations with human schistosomes and with the human host in India. Even if it be proved that emetine is more toxic to *S. spindalis* than antimony tartrate, it has not been shown that man ever is a host for *S. spindalis*.

The selective action of antimony tartrate.—Intravenous antimony tartrate in schistosomiasis has two distinct bio-chemical actions, parasitocidal and physiological; or using Ehrlich's terminology, parasito-tropic attraction for the parasite and organo-tropic affinity for the tissue cells of the host. Antimony is curiously selective both as regards the parasites and the organs and tissues it affects.

Aragao and Vianna.—It would seem that it has a parasito-tropic action on some bacteria and not on others—the organism of ulcerating granuloma of the pudenda,* for example.

Antimony tartrate has a parasito-tropic action on the Leishman-Donovan body, but no appreciable effect on other protozoa.

Antimony tartrate has a parasito-tropic action on all forms of human schistosomiasis, but it has no known action on other helminthic worms or even on other trematodes (e.g., *Fasciola hepatica* the liver fluke of sheep, man, etc.). And this parasito-tropic action appears to vary in intensity in individual worms or broods of the same species, selecting or picking out one brood more readily than another; this is possibly the reason why some adult cases of Bilharzia may be cured by as little as 15 grains of antimony tartrate, whilst others take 30 grains.

With regard to organotropy, antimony appears to select certain tissues and organs, but not always

* *Bacillus mucosus capsulatus*—one of the suspected causes of the disease.

the same organs and the organs not always to the same extent. The liver, kidneys, the brouchial passages, cutaneous tissues, muscles, etc., appear to be selected, but somewhat capriciously, hence the variety of symptoms produced when antimony tartrate is injected intravenously.

Therefore it would not be surprising if the intensity of action of antimony tartrate varied according to the species of schistosome, and that it was less toxic to *S. spindalis* than to human schistosomiasis.

The sphere of purely laboratory work.—It would appear that sometimes laboratory work is given a position of more importance than clinical work. Laboratory work with regard to the action of drugs is certainly useful for preliminary investigations regarding dosage and to investigate details which necessitate the death of the host and to elucidate points which can be investigated with laboratory apparatus alone. But where investigation can be made by using exactly the paraphernalia from which the conclusions are to be drawn, clinical observations are needed, and laboratory work is not acceptable as a substitute.

Lower animals, test tubes and substitute conditions cannot take the place of investigations carried out under natural conditions.

The problem antimony versus emetine is an important one for India, where schistosomiasis probably exists in localities where it has not yet been identified.

F. Milton has privately reported cases from Ooty which he suspects to be intestinal schistosomiasis, and J. P. Cullen (Nanttu) has already reported the Yunnan Province of China to be an endemic area, and the adjacent portion of Burma and the Schwelin tributary of the Irrawaddy to be infected.

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THE TREATMENT OF STIFF JOINTS.

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PROBABLY no profession in the world is more under the tyranny of the "hypnotic phrase" than is the medical profession. By the expression hypnotic phrase I mean a phrase which puts the judgment to sleep and paralyses all movement towards investigation in the mind.

Unfortunately in our profession the science of words forms no part of the training of a medical man: it is an essential part of the education of a lawyer.

The particular phrase to which I wish to draw attention in this article is "the breaking down of adhesions," a fine old hypnotic phrase which has done a vast amount of harm in its day, and will, I have no doubt, survive to do more harm yet in the future.

The application of the phrase is as follows:—

A man, woman, or child breaks an arm or sustains an injury in or in the neighbourhood of a joint. After a longer or shorter period of immobilisation according to the therapeutic leanings of the particular surgeon or physician who has been called in to the sufferer, a degree of stiffness sets in in the neighbourhood of the joint. The time is now ripe for the medical attendant to do what he calls breaking down the adhesions. This is usually done under an anæsthetic, as in the first place the sentinel muscles would resist up to the point of their own rupture the trauma and violence to which it is proposed to subject the shortened ligaments and fasciæ about the joint, and secondly the pain entailed would be far too great for any one to endure without an anæsthetic.

The limb is forcibly straightened under the anæsthetic with the result that the next day the patient is unable to move the limb at all owing to the acute pain, swelling, and inflammation following the trauma to which the limb has been subjected.

After two or three repetitions of this treatment the range of movement usually becomes progressively less, and the sufferer seeks some less strenuous form of therapeutics. He is liable to end by placing himself in the hands of one of the great army of irregular healers and his case will probably go to

glorify the literature of the era, the Christian scientists, the electro-manipulators, the osteopaths or the homeopaths. Thus is one more sheep lost from the flock of the true believers, owing to a too rigid application of dogma.

At the best the patient is left to the ministrations of a competent masseuse or masseur, who by their patient stretchings will in time undo the damage done by the violence to which the structures have been subjected and will, in time, lengthen the shortened tendons and ligaments so that the joint will be able to regain a measure of its former usefulness.

I do not wish it to be thought that I am condemning the treatment of all stiffened joints under an anæsthetic; far from it, it is a most useful treatment in the proper class of case, but it is as well to make sure that the case is one to which this treatment is appropriate.

In what class of case is this treatment suitable? The class of case in which this treatment is suitable is that in which there are either within or outside the joint adhesions which definitely limit the movements of the limb. It is difficult to define by words the exact sensation of the limitation imposed by adhesions to the manipulations of the surgeon, but it is a very definite one and unmistakable to an experienced hand. It is quite a different feel to the unyielding jar of a bony obstruction which is usually painless; it differs again from the elastic resistance of shortened tendons and muscles, which is, by the way, often extremely painful.

There is usually some degree of free movement, nearly always limited in the direction of extension, but very definitely checked as soon as the limiting band is fully extended. Any attempt to pass that limit is accompanied by pain. This is the class of case which was the foundation of the bone-setter's fame and income. These stiffened joints formed the arenas in which the bone-setter gained many a victory over the legitimate professors of the healing art, who too often alas! had to retire from the contest with humbled crest and damaged reputations.

The history of a typical case is as under:—

A sporting peer has injured his knee when hunting. After some months' treatment by his regular medical attendant he becomes disgusted and is advised to go to Mr. Blank, the bone-setter, who has so many successes to his credit in this class of case. He limps into the consulting room on crutches and ten minutes later marches out briskly and returns to his residence on foot, his now useless crutches following him in the conveyance which carried him to the house of the bone-setter.

This apparent miracle was brought about as follows:—The bone-setter, by a series of rotary movements designed to throw the sentinel muscles of the knee off their guard, with a sudden brusque movement fully flexes the joint.

A tiny report is often audible as the adhesion snaps, due, the bone-setter assures the patient, to the "going

in" of the displaced bone which has been the source of all the trouble.

The moral effect on the patient is great, both from the obvious freedom of the joint after months of disability and from the confident injunction to walk without fear of ill consequences. As the anatomical knowledge of the patient is unlikely to be greater than that of the bone-setter, his pathology is accepted by the former with proper submission.

After a due measure of denunciation of the quackery of the bone-setter, the "legitimate profession" quietly adopted the manœuvres on which his practice was founded, without, I fear, any very public expression of gratitude for the gift which had been made to them.

Here was a real advance in the treatment of injuries to limbs, but, admirable as it is in properly selected cases, it is not of universal applicability.

Simple fractures in and about the neighbourhood of joints are very unlikely to produce adhesions in the proper sense of the term. What is produced after prolonged immobilization is "contracture" of muscles, and in time shortening of ligaments and fascia.

All that has happened is that the muscles, in obedience to that law which bids them shorten if their points of origin and insertion are approximated for any length of time, have taken up the slack and adapted their length to the new conditions. Half the devices of orthopædic surgery depend upon this property of voluntary muscle, such as the crooked heel and the thickening of the inner side of the boot-sole in the treatment of flat foot.

It should be obvious that violent wrenching and traumatisation of such shortened muscles and structures can only result in an increase of the original disability.

The following case will illustrate my meaning:—

Mrs. A. in 1917 fractured her right arm; the fracture was "plated," the plate was subsequently removed and for some reason the arm was immobilised for a prolonged period.

When told that she might now use the arm without fear of re-fracturing it, it was found that there was very considerable difficulty in separating the elbow from the side, all the muscles opposing this movement having shortened owing to the prolonged immobilization to which the arm had been subjected.

As the surgeon who had originally operated on her arm had returned to England, she consulted another practitioner who told her that the cause of her disability was the formation of adhesions in and about the shoulder-joint and that all that was necessary to restore the joint to its former usefulness was to "break down" the adhesions which had formed. This was accordingly done under an anæsthetic, with the result that she was unable to move the limb at all for some weeks. As she did not improve, the procedure was repeated after a few months but without benefit.

The patient came to me in May, 1921.

The shoulder was fixed and she could only abduct the elbow 4 inches from the side; all other movements of flexion and extension were similarly limited. She was placed in charge of an experienced and competent masseuse, who was instructed to use no violence and to give

the patient as little pain as possible as the treatment would of necessity be a prolonged one.

At the expiry of four months she had almost completely regained full movement, a very happy result, to which the pluck and perseverance of the patient very materially contributed. I regard the assistance and co-operation of a trained masseuse as essential in this class of case, as without their moral support the keenest patient loses interest in carrying out exercises which yield such a meagre harvest of results daily.

A very great and important part of the treatment consists in the performance of voluntary movements by the patient, which explains the slowness of progress in the case of children who do not see the importance of their co-operation in the treatment.

Many of these cases need never have arisen had movements and judicious massage been instituted within a few days of the occurrence of the injuries; the very surest way to produce them is by prolonged immobilization.

It may be thought that I have discussed this subject at undue length, but the importance of a disease or disability is to be measured rather by the number of those who suffer from it, than by its rarity: these conditions are so common and the results are so frequently unsatisfactory both to patient and to medical attendant as to excuse my prolixity in a consideration of their treatment.

DETAINING OF PATIENTS.

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By "the detaining of patients" is meant the keeping of patients in hospital, from a few hours to three or more days, without entering their particulars in the register of in-patients, or showing them as in-patients in any of the records of the hospital.

The health of institutions, such as prisons, schools, factories, departments, etc., is estimated, not by their sickness, but by statistics such as:—

Annual ratio of admissions per 1,000 of strength.

Annual ratio of constantly sick per 1,000 of strength.

Average annual number constantly sick.

Average sick time to each person.

The above statistics are based either on the total number of in-patients or on the number of days spent in the hospital by each of these in-patients. Consequently, with a view to showing a good health record, many, if not all, of these institutions have adopted the system of "detaining" patients in the hospital for mild ailments, for one, two, three or more days and then, if necessary, of admitting them as in-patients. This means that the particulars of these patients during their detention are not entered in the register of in-patients, with the result that:—

(a) the total number of the in-patients is reduced, as many of the detained cases recover during the period of their detention and leave the hospital without being admitted as in-patients;

(b) the total number of days spent in the hospital by the in-patients is reduced, as the days of detention in the hospital, if any, prior to being admitted as in-patients, are excluded.

There is no uniformity in the different institutions with regard to this system of detaining patients in hospital, as will be seen from the following:—

(1) There is no definite standard of illness to decide when to detain and when to admit.

(2) All severe cases of sickness are admitted into the hospital without any detention.

(3) Some institutions detain patients for 1 day.

(4) Some institutions detain patients for 2 days.

(5) Some institutions detain patients for 3 days.

(6) Some institutions detain patients from 1 to 3 days according to the merits of each case.

(7) Some institutions, on deciding to admit a detained case as an in-patient, do so from the date on which the decision has been made—that is, after the patient has been detained for one or more days. This is wrong, as the days of detention will be excluded from the actual number of days spent by the patient in the hospital.

(8) Some institutions, on deciding to admit a detained case as an in-patient, do so from the date the patient was detained in the hospital under observation. The usual practice of these hospitals is to enter the particulars of this patient after the particulars of the patient last entered in the register, and grant him or her the next consecutive number in the appropriate group. This means that the actual date of the patient's admission is entered, perhaps, many days out of its proper place and the register number is not in its sequence. In large hospitals, with many admissions daily, the patients under this system may have their particulars entered in the register quite one hundred places out of their proper place. Hence this system causes great confusion.

Under these circumstances the returns and the statistics of similar institutions are very badly "cooked" and are incomparable, and so they are, to all intents and purposes, useless.

An argument put forward for detaining patients for one day is that their meals are supplied to them from their unit cook-house, while, if they were admitted as in-patients, they would get their meals from the hospital, and so the rations drawn by the unit cook-house would be wasted, and in the case of large numbers of patients this wastage is well worth consideration. This argument may be feasible for patients detained in the hospital for one day, but it is certainly not so for the

patients detained for two or more days, nor for patients admitted into the hospital as in-patients without detention. Quite a large number of the patients with acute illnesses, whether admitted as in-patients or detained, are not able to take their ordinary meals, and so have to be supplied with milk, either as a diet or as an extra from the hospital, with the result that their rations drawn by the unit cook-house will be wasted as far as the institution is concerned. From the above it will be seen that in institutional hospitals the system of detaining mild cases is not a good one, and so it is recommended that all patients taken into the wards should be admitted as in-patients and not detained, and thus be a true index of the health of the institution, if this is based on the number of the in-patients.

In some institutions there is a rule that an employee is entitled to a certain amount of leave in the year, but the days spent on the sick list are deducted from the amount of leave due. Therefore with the view of doing a mild case a "good turn" he or she is shown as detained, and neither admitted into the hospital as an in-patient nor on the sick list in his or her quarters. The result of this is that the days of detention are not reported to the proper authorities, and consequently are not deducted from the leave due to the individual. This, for reasons quite obvious, is fair neither to the employer nor to the other employees, who have to do the detained individual's work. This system of detaining patients either in or out of the hospital with the object of doing him or her a "good turn" may actually do him or her harm, as seen from the following case:—

Many years ago a patient had many attacks of malaria over a period of about a year and a half, for which he was detained in the hospital for a few days each time, instead of being admitted on the books as an in-patient. This malaria made him depressed and he felt that a change to Europe was essential, and so he claimed leave and a free passage to England, in accordance with the terms of his agreement. He was asked to produce a medical certificate in support of his claim, which the officiating medical officer had great difficulty in granting, as the individual concerned as stated above had not been admitted as an in-patient of the hospital, and so there was nothing to show evidence of the frequent attacks of malaria. Further, the officiating medical officer was placed in the awkward position of having to avoid showing up the system maintained by the permanent incumbent of the appointment.

Some institutional hospitals have the system of detaining in the wards individuals under observation, in preference to admitting them as in-patients. Persons who are malingering attend the hospital, with the object of being detained in the hospital, so as to avoid work, duty, school and such like. These patients are detained in the hospital for observation, and if they are found

to be suffering from a disease and requiring admission as in-patients, their particulars are entered in the register of the in-patients, either from the date on which the decision was made or from the date the patient was detained. The merits and demerits of these dates will be seen respectively in (7) and (8) above.

If they are found to be suffering from no appreciable disease (N.A.D.), they are discharged from the hospital, and not shown in any of the records of the hospital, except, perhaps, by a note made in some scroll book. The reason put forward by some for this procedure is that it shows a better health record of the institution. This is no reason, as the health of the institution cannot be affected by them, as, if admitted, they will be shown as "N.A.D." and not included amongst the statistics of the diseases, on which the health of the institution is based. Consequently it is strongly recommended that these persons under observation should be admitted as in-patients of the hospital, and given serial numbers in the ordinary group in preference to detaining them. In the event of their being found to be suffering from a disease or an injury, they merely continue with the serial number granted to them, and the disease or the injury is entered in the column for the diagnosis. In the event of their being found to be suffering from neither a disease nor an injury, then one of the following two methods can be adopted:—

(a) Let them continue with the serial number in the ordinary group, and at the foot of each page of the register make progressive totals of the ordinary and N.A.D. cases, thus:—

| | |
|----------------|----------------------------|
| On page 1..... | Ordinary cases = 18. |
| | N.A.D. cases = 2. |
| On page 2..... | Ordinary cases = 18+19=37. |
| | N.A.D. cases = 2+1=3. |
| On page 3..... | Ordinary cases = 37+17=54. |
| | N.A.D. cases = 3+5=8. |

and so on.

This means that the last serial number of each group of patients does not indicate the total number of the admissions in that group, and so this system is not recommended.

(b) As soon as the case is diagnosed as "N.A.D.", adopt the following procedure:—

(1) Enter "N.A.D." in the column for diagnosis.

(2) Place "N.A.D." before the serial number in the group column of the register. Suppose the serial number is 15. By placing "N.A.D." before it, this converts it into N.A.D. 15. The result of this is that this case cannot be included amongst the total number of the cases admitted under the ordinary group.

(3) In the remarks column of the register, against 15 (or as now converted into N.A.D. 15) state "Rectified by 86A." (The latter number 86A is merely an assumed number used for convenience of explanation.)

(4) In the remarks column of the register against 86A state "To rectify N.A.D. 15."

(5) The next patient after 86A in the ordinary group must be numbered 87.

Mental or police cases suspected of malingering are detained for observation in certain hospitals. These patients, if found later to be suffering from disease or from the effects of drugs, etc., are admitted into the hospital as in-patients either from the date on which the diagnosis was made, or from the date on which the patient was detained, and if they are found to be suffering from no appreciable disease (N.A.D.) they are discharged from the hospital. The reasons put forward for detaining these patients in preference to admitting them is that they cannot be admitted as in-patients till they are found to be suffering from disease and require treatment. This is not a good reason, and so with a view to simplifying the admissions, returns, and the dieting of them, etc., it is recommended that all these patients should be admitted and dealt with in a similar manner to the patients detained for observation in institutional hospitals described in the last few paragraphs.

Institutional hospitals frequently detain in the wards, in preference to admitting them as in-patients, individuals who have been inoculated or vaccinated for prophylactic reasons, on the grounds that they are suffering from a reaction only, and not from any disease, and so they should not be included amongst the sick of the unit. If they were included, the health of the institution would appear to be worse than it really was. It is essential that a record should be kept of these reactions, and the number of days spent in the hospital by each individual, and so it is recommended that these persons should be admitted into the hospital and granted serial numbers with "D" before them. The "D" stands for "Detained," and so this will prevent these cases from being included amongst the figures of the diseases, on which the health of the unit is based. By their admission there is no difficulty of dieting them from the hospital.

It may here be stated that in some institutional hospitals patients suffering from reactions following inoculations or vaccinations for prophylactic reasons are admitted into and shown as in-patients of the hospital and are diagnosed as "effects of, say, anti-typhoid vaccine." There is no such disease as "effects of anti-typhoid vaccine" in the "Nomenclature of Diseases," and so when the statistics are worked out these cases are ignored, but they cause confusion and perhaps additional work. Consequently the author recommends the method given in the last paragraph.

Persons who are "carriers of disease" are frequently taken into hospitals, and the question has arisen as to whether they should be shown as in-patients or detained in the hospital. If admitted,

difficulties arise as regards the statistics of the hospital as they are really not suffering from the disease, and if detained difficulties arise about their diets. Consequently the method mentioned in the paragraph before the last is recommended to be adopted.

The following are the kinds of disease carriers:—typhoid fever, paratyphoid A. fever, paratyphoid B. fever, diphtheria, dysentery, cholera, etc.

In most hospitals there is a practice of detaining out-patients in the wards so as to enable them to get over the effects of operations and anaesthetics. The period of detention varies in most hospitals, and also in the individual cases, but it is usually from about one or two hours to technically two days. This system of detaining out-patients may not be important from a statistical point of view, but it is from a financial point of view, as seen in the following cases:—

In a Venereal Disease Clinic in the United Kingdom the out-patient department is under the control of the Local Municipality, and the attached wards are under the control of the hospital, which depends on charity for its financial support, and both of them are managed by the same staff. The local authority (Municipality) is charged 5 shillings a day for each "venereal" patient admitted into the wards. In this clinic the practice, after lumbar puncture, of which cases are numerous, is to detain, in the wards, out-patients for nearly 24 hours, which period is technically, according to the rules of most hospitals, two days. These patients, while in the wards, are given a bed, towel, light diet such as tea, milk, sugar, bread and butter, and perhaps also have to be nursed. This system raises several points, and their discussion is beyond the scope of this paper, except that all will agree readily that it is quite wrong for a hospital depending on charity for its finances not only to be deprived of ten shillings, but also to be put to the additional expense of supplying diet, linen, etc., for each of these patients for two days.

In many hospitals the number of out-patients detained in this way for several hours a day numbers over a thousand a year, and yet the medical and the nursing staff do not see that this procedure, to put it bluntly, is cutting their own throats. These out-patients, if admitted into and discharged from the hospital on one and the same day, will be technically one day in the hospital, and so they will increase the number of not only the in-patients, but also the daily average of in-door sick of the hospital. The ultimate result of this will be that the budget allotment for the nursing and the other staff, and also for diet, bedding, drugs, etc., can be so increased as to make the great difference of managing the hospital more efficiently. The author has seen the budget of a hospital increased for the above reasons, with the further result that the hospital personnel was increased. In addition, all the paying patients paid the in-door charges according

to the accommodation they received. In another hospital this system of admitting these patients had the effect of converting a second class hospital into a first class, with consequent increase of personnel and equipment, and even in the salary of some of the staff. It has been and will be argued that none of these patients operated on and detained for a few hours should be shown as in-patients. Pending the decision of a central authority, the author is of the opinion that these patients should be shown as in-patients if they:—(a) are taken into the wards, or (b) remain in the out-patient department for more than two hours.

LEFT-HANDEDNESS.*

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THE subject of this evening's paper is left-handedness, which is also termed sinistrality or manciniism. At the outset it is important to state what this term really means. Hugh Gordon¹ describes a left-handed person as one who would use the left hand in preference to the right in all actions which are usually done by the right hand in the case of a right-handed person. Moutier (quoted by Hugh Gordon) also states that a left-handed person is one who habitually does with the left hand a series of professional and customary acts generally done by the right hand in the case of the right-handed, and that the ambidextrous are those who do these acts with either hand indifferently.

In the popular mind there is a universal idea of inferiority, awkwardness or unfavourableness associated with left-handedness. For example when we speak of a left-handed compliment, which is worse than damning with faint praise and is disliked by all. Again we call it a left-handed marriage in which the bride-groom gives his left instead of his right hand to the bride as in a morgauatic marriage, which is an inferior form of marriage of a male member of a royal family with a woman of inferior rank—hence a left-handed wife, a left-handed son. Again we Indians use the left hand in performing unclean actions, as for example, washing ourselves after answering the calls of nature. Similar examples can be multiplied. On the other hand, the right hand has been given the place of honour,—as when we speak of a company's right-hand man, or even of an error or the like, we say "too great generosity is a right-handed fault." We Indians, whenever we offer anybody

anything, generally do so with the right hand. The act of blessing is universally performed with the right hand. Many other examples might similarly be mentioned.

Now let us turn our attention to some experiments made and conclusions drawn from them by scientific men in this connection. In an investigation by Hugh Gordon in the elementary schools in Middlesex and London, he found the following:—Out of 3,298 pupils examined, he found 241, that is to say 7.3 per cent. left-handed; whilst in the mental defective schools, out of 4,620 students 843, that is to say, 18.2 per cent. were found left-handed. There appear, therefore, to be more than two and a half times as many left-handed children in mentally defective schools as in ordinary schools. Ballard² notices a higher percentage of left-handed children in mental defective schools than in ordinary elementary schools, i.e., 6.5 per cent. against 4.1 per cent.; whilst

Miss. T.

Right hand. a b c d
e f g h
Left hand. i j k l
m n o p

Mrs. H.

Left hand: Corrects
mirror writing -

a b c

Left hand: writing
fairly rapidly. 1 10 9 8 7 6 5 4 3 2 1

Mr. B.

Right hand -

Left hand

A b c d e f g h
i j k l m n o p

Right hand.

Left hand.

1 2 3 4 5 6 7 8 9 10
0 1 8 9 10 11 12 13 14 15 16 17 18 19 20

* An abridged form of a paper read before the Ranchi Medical Society on 2nd August, 1924.

others, e.g., Franklin Jones, Josefa Ioteyko, etc., put down the percentage in ordinary schools at a still smaller figure than the above. Again out of 374 boys in special schools, Hugh Gordon found 61, i.e., 16.6 per cent. left-handed, while out of 355 girls 76, i.e., 20.7 per cent. were found left-handed, thus showing that left-handedness is more common among girls than among boys. J. Jackson³ refers to the opinion that the insane have a great percentage of partial ambidexters in their ranks, and that there is a high percentage of left-handed among criminals. Mayet found a high percentage (16 to 30) of ambidextrous and left-handed among idiots and epileptics. Prof. Lombroso⁴ says "Left-handedness is a sign of degeneracy."

Out of 9,176 boys in 407 lower primary schools in the Jamui subdivision of the Monghyr District there were 8, i.e., 0.09 per cent. left-handed, and of these 8, 3 were stammerers. Again out of 276 patients at the Patna Mental Hospital 12, i.e., 4.3 per cent. were found left-handed (cf. this 4.3 per cent. with the above 0.09 per cent. in elementary schools). Out of 345 pupils in the Hazaribagh Reformatory School, 5, i.e., 1.4 per cent. were found left-handed, (cf. again this percentage with 0.09 per cent. in elementary schools). Out of 205 inmates of the Juvenile Jail at Monghyr only one, i.e., 0.4 per cent. was found left-handed. In the Ranchi European Mental Hospital out of 151 patients of whom 76 are males and 75 females, 10, i.e., 6.6 per cent. were found left-handed. And of these 10, 8, or 10.6 per cent. were females and 2, i.e., 2.6 per cent. males, thus showing a much higher percentage of incidence in females.

All these figures clearly show that the percentage of left-handedness is much higher in an abnormal class of people, e.g., mentally defective, insanes, truants, incorrigibles, criminals, etc. Hence left-handedness can hardly be considered as a normal variation. On the other hand very rare cases can be cited of left-handedness associated with an extraordinary degree of intelligence or capability. Minute inquires in many of these cases may show either that they are forced to be left-handed owing to circumstances, e.g., loss of the right arm, hand, even right thumb, injuries to the nervous or muscular systems, or various degrees of functional disorders of the mind, e.g., psychoneurosis, neurosis, psychosis, etc.

Besides what has been said above, left-handedness has been found to be very commonly associated with mirror writing. Mirror writing is a form of writing in reversed letters which can be easily read with the help of a looking-glass. Hugh Gordon⁵ says "Early in the investigation it was noticed that there was a much higher percentage of mirror writers among children, who, although they

wrote with the right hand, were evidently left-handed in many other of their activities." Ballard⁶ says about mirror writing "With rare exceptions it is done by the left-handed people only, and with the left hand only. The subject does not recognise at first the word as he writes it down. A. L. Beely, Instructor in Psychology, Utah University, after investigation in the schools of Chicago in 1918, says that mirror writing is a characteristic of extreme left-handedness. Ireland⁷ also mentions that mirror writing is common among the left-handed. The specimens of mirror writing shown here were produced by the patients when they were asked simply to write with the left-hand and without any suggestion of any kind, but it was interesting to observe them writing thus without detecting their own mistake and correcting it. L. G. Fildes and C. S. Myers⁸ report an interesting case of extreme left-handedness and reversal of letters. This was a markedly left-handed boy of about 7 years of age. His maternal grandfather, his maternal uncle, and a son of that uncle were also left-handed. The boy knew some, but not all of the letters of the alphabet, and all the ten Arabic numerals. He had just begun to be taught to write with his right hand, but he found the greatest difficulty in doing so, owing to the coarseness and the want of co-ordination of the movements of that hand. For these reasons and especially because he began to stutter, he was soon allowed to write with his left hand only, whereupon the confusion of the positions of letters and the disturbance of speech rapidly disappeared. Another interesting case of a left-handed child has been mentioned by a correspondent, H. A. Clowes.⁹ She is a decidedly left-handed child and all movements requiring skill, such as threading, a needle, drawing, and attempts at writing, are performed with the left hand. When writing the capital letters of the alphabet without a copy, the letters which should turn to the right are turned to the left and vice versa as in B and E, and when drawing a face in profile the face is made to turn to the right, which is quite unusual with right-handed children. Attempts to use the right hand for drawing, etc., are very unsuccessful and are made with painful efforts. She says they make her feel sick. In another case in the *British Medical Journal* of 24th May, 1924, it is said that it caused the child pain and sickness when she was made to write with her right hand, but with her left she wrote easily, though it was backwards. Another very interesting case of mirror writing with some drawings has been described by J. L. M. Symms¹⁰. In this case, on the left-handed child being asked in her scripture class to draw the story of the "Three Wise Men," she cried bitterly because she was unable to depict

them walking towards the manger. There is a boy in the Kanke (Ranchi) Lower Primary School, of about six years of age, who is just learning his alphabet; he writes correctly with facility with the left hand, but writes with the greatest difficulty with his *right hand*, and then only in mirror fashion.

After experiments on the problem of mirror writing, L. G. Fildes¹¹ comes to the following conclusions:—(1) Mirror or reversed writing is very commonly found among young children and defective children. It varies in kind from occasional reversal of single letters to a complete reversal of all words and letters written (true mirror writing). The latter, however, is comparatively rare. (2) It is found most frequently in association with left-handedness, but it also occurs in varying degrees among right-handed children, who have never written except with the right hand. (3) It occurs both in copying letters and in writing from memory. There seems no doubt that the tendency to reverse letters seen in mirror writing is only part of a larger tendency, especially among young children, to reproduce forms without any apparent heed to the position which they occupy in space. In support of the last view expressed above, I may mention with profit some similar observations made by Major Berkeley Hill and Prof. Henry Head, who in course of his correspondence with the former, in reply says: "I am much interested to hear what you say about the way in which some of the native troops (of Uganda) read with the books upside down; this is a well known condition in children. Many children are quite content to look at pictures upside down or sideways, and it makes no apparent difference to them that the figure is the wrong way up. Occasionally this peculiarity persists even after they are able to read."

Squint has also been found in many cases to be associated with left-handedness. Out of 10 cases of left-handedness in the Ranchi European Mental Hospital, 5 have squint also. W. S. Inman¹² says that he investigated 150 consecutive family cases of squint. In 13 the patient was a non-squinter, giving a family history of the three conditions, viz., squint, left-handedness and stammering. Out of the remaining 137, all of whom were squinters, 33 or 24 per cent. were left-handed. Again out of these 137 squinters only 19 were stammerers, while four cases showed all the three conditions, viz., they were left-handed, they stammered and they squinted. In an address on "Squint, Mancinism, and Tubercle," W. C. Rivers¹³ says that out of 120 cases of squint investigated 10 were left-handed and all these 10 were *left-eyed* squinters also. In another place he quotes Lombroso and Fere, according to whom mancism has

been reckoned among the stigmata of degeneracy. He also quotes Markel and others who say that savages, lunatics and criminals show excess of mancism.

To quote Hugh Gordon again, he says that Ballard and others have shown that stammering is more prevalent among left-handed children who write with the right hand, than among pure left- or right-handed children. Out of 10 left-handed patients of the Ranchi European Mental Hospital, there are three only who are defective in speech, (I mean defective in articulation).

In conclusion, it may not be out of place to describe the cases of left-handedness in the local mental hospital:—

1. Miss G.—Imbecile, left-handed, squint in both eyes, left more so.
2. Mrs. C.—Maniac-depressive insanity; left-handed; has high errors of refraction, mirror writer.
3. Mrs. Bk.—Secondary dementia, left-handed, squint in the left eye alone.
4. Miss Bl.—Imbecile, left-handed, squint in both eyes; defective speech.
5. Mrs. A.—Dementia præcox; left-handed.
6. Miss M.—Epileptic, left-handed, squint in the left eye and defective speech.
7. Mrs. T.—Dementia præcox; left-handed.
8. Mrs. H.—Maniac-depressive insanity; left-handed; mirror writer.
9. Mr. B.—Imbecile, left-handed, squint in both eyes; mirror writer.
10. Mr. S.—Imbecile, left-handed, and defective speech.

In a subsequent paper I hope to deal with the causes of left-handedness and mirror writing and some problems connected with them.

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Indian Medical Gazette.

MARCH.

LEPROSY RESEARCH.

THE *Annals of Tropical Medicine and Parasitology* of October 31st, 1924, contain the Croonian Lectures on this subject by Sir Leonard Rogers. In the first lecture the association between leprosy incidence and atmospheric humidity is discussed. Among the conditions influencing the prevalence of leprosy are:—

(1) The general hygienic condition of the people.

(2) The introduction of infected persons.

The communicability of the disease is regarded as being established, though the precise manner of transfer of the infection has not been cleared up.

Long and close association with a leper is usually the history of the affected person, but sometimes a single close contact with a leper appears to have been enough to convey the infection.

The active nodular form is much more dangerous than the late nerve type, and children are much more susceptible than adults. Congenital leprosy is extremely rare, and the segregation of infants from the leper parents is essential. The modes of infection may be (1) by the skin, through wounds or abrasions which become contaminated with infective material, either by contact with the leper or by wearing his clothes. (2) The nasal mucosa is not so likely a channel of infection as has been thought. (3) Flies, mosquitoes, bed bugs and other insects are under suspicion.

The best method of prophylaxis is segregation, this has always been effective wherever it is properly carried out. Sir Leonard gives some interesting examples of isolation laws which have been enforced from the time of Moses. In Nigeria all young lepers were killed, in Sumatra they were buried alive, in Western India they were drowned. The most effective segregation of modern days was carried out in Normay, where the disease in 1856 was much more common than it is to-day in India. Now the new cases are only 2.5 per cent. of the number occurring when segregation was started. In tropical countries the difficulties are much greater than in European countries and effective segregation is admittedly impracticable. The policy advocated by Sir Leonard consists of:—

(1) The encouragement of effective early treatment, which is popular wherever it is properly carried out. The result of this is that the persons affected rarely reach a stage of the disease at which they become highly infective; while

advanced cases also become less dangerous to the community.

(2) Careful observation of the persons who have come in contact with other cases, so as to detect the disease at the earliest possible moment.

(3) The isolation of the advanced infective cases in special hospitals and colonies.

Experience in Honolulu is said to show that it is possible to diminish the number of lepers in a community by one half in ten years. When the numbers have been brought down to a considerable extent, it will be possible to increase the efficiency of treatment and control, so that progressively more rapid elimination of the disease can be expected. The detailed programme varies according to the conditions of each country; compulsory segregation is suitable only in countries where public opinion is sufficiently advanced, but in India the work will have to be carried out on a voluntary basis. Large colonies are advocated with ample land available for cultivation, so that highly infective patients can be kept under conditions which are favourable to their recovery, while the community is protected against contact with them. The early and less infective cases can be dealt with at hospital and dispensary clinics: the non-infective mutilated cases will not be dealt with by either of these institutions, as they are not so dangerous as to justify the expenditure involved by treatment and segregation. The method of dealing with these is not discussed, presumably the old-fashioned leper asylums will be sufficient to deal with them. Children born to leprosy persons should be separated at once from their parents at the earliest possible moment and sent to live with healthy relatives, so that they can be given a good prospect of escaping from the disease.

In the third lecture the treatment of the disease is discussed and emphasis is laid on the difficulty of estimating the effect of any special line of treatment. This arises from the extreme variability in the severity of the disease and in its tendency to spontaneous remissions and exacerbations. There are nearly as many "cures" for leprosy as for tuberculosis. Mercury, antimony and arsenic have been advocated, iodides and iodoform have met with some measure of success. Vaccines have had their triumphs, nastin and leprolin have resulted in temporary successes, but the derivatives of chaulmoogra oil and the crude oil itself now hold the field as the most promising remedies for the disease. The part played by Sir Leonard in developing the use of this valuable indigenous drug is well known to our readers, but the account given in the lecture should be read by every one who is interested in the leprosy problem. Great emphasis is laid on the importance of early treatment, as it is the recent cases which show the most rapid improvement and the largest percentage of clinical cures. Associated with this is the necessity for early diagnosis. Muir believes that the disease can almost always be detected

long before it becomes infectious, and he very strongly advocates the establishment of leprosy clinics on the lines on which he is working with such success at the Calcutta School of Tropical Medicine.

The prospect of permanent freedom from active signs of the disease is believed to be much greater than in tuberculosis. The last words of the lectures are, "the evidence that the treatment actually leads to destruction of the lepra bacillus in the body not only places it in a more hopeful position than the building up of the resisting powers of the tissues by the sanatorium treatment of tuberculosis, but also raises the still more important question of the possibility of applying the new line of treatment to the white man's scourge, tuberculosis." The most sceptical must admit that the outlook on the great scourge, leprosy, has been revolutionized by the genius and enthusiasm of Sir Leonard Rogers. It is legitimate and reasonable to maintain a critical attitude towards the exaggerated claims that have been made by some of the propagandists of the modern methods of treatment. It is equally unreasonable and unscientific to adopt the pessimistic attitude which prevailed up till a few years ago, and to tell the victim of leprosy that we can do nothing for him.

The value of the newer treatment is too firmly established to admit of doubt, and while some of us believe that a large share of the success is due to the improved hygienic conditions which are part of the system of every good leprosy doctor, and to the stimulating effect of the hope that is instilled into him, the results that have been obtained should convince the most conservative that leprosy is a disease which is amenable to treatment; it is a disease which every doctor in India should be competent to treat with confidence and success.

All cases will not be cured, there may even be some failures, but taking the disease as a whole it will yield a far larger proportion of successes than the sister disease tuberculosis, towards which we have always rightly encouraged ourselves to adopt a hopeful attitude.

When the medical profession and the general public have learned the lesson that leprosy will yield to prompt and energetic treatment and that the disease is one of the controllable infections, progress will be rapid. The profession is still far too much imbued with the paralysing belief that leprosy is incurable, too often the patient is told that we can do nothing for him: he "asks for bread and is given a stone."

In every medical school and college there should be a course of lectures and demonstrations on the diagnosis and treatment of leprosy by a teacher who has an intimate practical knowledge of the disease. Until the teachers themselves are taught the medical profession cannot be expected to have sound views on the subject of leprosy.

J. W. D. M.

THE POSITION OF INDIAN I. M. S. OFFICERS UNDER THE LEE COMMISSION PROPOSALS.

The *Gazette of India* containing the details of the recommendations of the Lee Commission accepted by Government has recently been published. One curious point in these rules is that, although free passages to England and back have been allowed to members of the Indian Civil Service of Asiatic domicile and to their families, Indian members of the other superior civil services, including those of the I. M. S., have been debarred from this privilege. It is obviously very important that Indian members of the technical services should keep themselves abreast of modern developments in their subjects, and this can only be done by occasional visits to England. We hope that Government will see their way to extending the privilege of free passages to Indian officers of the Indian Medical Service. Such a step would be to the advantage of Government, and would make for increased efficiency in the service. The extra expense incurred would be very small in comparison with the benefits which would result.

A Mirror of Hospital Practice.

A USEFUL METHOD OF ADAPTING AN ARTIFICIAL EYE TO A NORMAL OR RE-CONSTRUCTED SOCKET.

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MAJOR, I.M.S.,

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Most ophthalmologists practising in India have had difficulty at some time or other in obtaining suitable glass eyes for patients. This depends largely on the local conditions determining the available supply of these articles. The bulk of artificial eyes supplied to the retail opticians in India are manufactured outside India, and when it is necessary to fit a patient with a prothesis, the stock of the optician has to be gone through in order to find something as nearly suitable as possible. Frequently one finds that the bulk of the stock consists of single shell specimens which are not to be recommended at all. Having excluded these, one next finds that the balance—the double shell or Snellen reform eyes—are for the most part made with light coloured irides. In the case of a patient with light coloured irides there is some chance of a match. The few remaining double shell eyes, however, which have brown irides give one very little choice as regards the shade of brown, size of cornea and pupil, general size and shape, so that one may have the trouble of going through anything up to 500 or 600 specimens,

only to meet with disappointment. One cannot, except in rare cases, send the patient to the manufacturers. Under these circumstances one is frequently obliged to make shift with a shell too big or too small, or if the right size be luckily obtained, of quite the wrong colour. One is, indeed, fortunate if the right size is procured, for this makes it possible to preserve the socket in a suitable state till by a lucky chance the correct article is found. Patients, who cannot get a double shell of approximate colour and size, frequently resort to wearing a single shell which seems to them more suitable. In the end this gives rise to trouble, and as often as not a contracted socket is the result. This opens up the question of dealing with the contracted socket. It was in the past notoriously difficult to adapt a contracted socket for the reception of a prosthesis by plastic operation. The number of operative procedures designed to this end bears witness to the fact. The war fortunately gave a great stimulus to the plastic surgery of abnormal sockets, and now we have the method of epithelial inlays well established. Gillies in London, and Wheeler in New York, and others on the continent of Europe, have added greatly to our knowledge in this direction, so that at present one can undertake the planting of a suitable epithelial graft wrapped round a mould, in a freshly made pocket in the orbital tissues. With care these grafts always take, and a pocket of the desired shape and size is formed, suitable for the reception of a prosthesis. One cannot, however, cater for the standard glass eye, and so it becomes necessary for such sockets to be suitably "fitted." In these cases one is faced with an even greater difficulty in India than in the case of the normal socket, because the new socket is more irregular, and if it is not filled, it tends to contract and all one's labour is in vain. In hospital practice in Madras up till recently the number of glass eyes supplied was comparatively small, chiefly because the average patient is very loth to have an eye-ball removed, even though the procedure is surgically advisable, and also on account of the expense of artificial glass eyes. Nowadays, however, Indian patients of the hospital class and of the better classes too, desire more and more to have glass eyes and it is desirable that there should be some way of obtaining suitable shells from manufacturers abroad; and also that, till reliable manufacturers are established in India, there should be a simple way of preserving the socket pending the receipt of the required article. Formerly, if a suitable prosthesis was not available locally, the method of taking a plaster cast of the socket was available, but this is a difficult and not altogether satisfactory procedure. Should a suitable cast be obtained, it had the position

and size of the cornea marked upon it, the size of the pupil noted, and the cast, together with the shade of iris required was forwarded either to an optician holding a large stock for matching or to manufacturers abroad. In the case of a re-constructed socket even this method is denied to the surgeon, for by the time the model is copied, the copy is no longer suited to the socket.

Having been faced with these difficulties over and over again, I tried to come to some arrangement with a well-known manufacturer in London to supply me with a series of standard shapes and sizes, a duplicate of which he should keep; and also a set of 24 different shades of brown of which he should retain matches. I hoped in this way to be able to quote him a certain number for size and shape and another number for shade of iris, giving actual measurements for cornea, pupil and position of cornea and allow him to blow a suitable double shell. He did not consider this a practical procedure and so negotiations broke down. Recently, having had to cater for the needs of a series of patients in whom I had re-constructed the socket by means of epithelial inlays, I tried modelling shells out of dental stent and covering them evenly with hard paraffin by dipping. The stent gradually altered shape at body temperature and so proved useless. The experiment, however, suggested modelling in paraffin and this proved highly successful. After numerous steps, which need not be recorded, a definite plan has been arrived at, as follows.

An approximate model is cut out of a solid uniform block of paraffin of 60° melting point, free from bubbles, such as may be obtained from a laboratory. Care is taken to have it too big in all directions in the first instance. This is carefully whittled down with a scalpel, aided by the heated handle of a scalpel for hollowing out the back. All the peculiarities of the socket are gradually catered for till a good fit is obtained. Then if a more artistic effect is desired, the position of the cornea is marked in front whilst the paraffin shell is still in position. The shell is then removed and the corneal area countersunk. A piece of paper suitably coloured to the correct shade of the iris and cut to size is then soaked in hot paraffin and let into the depressed circle of the shell surface, made to adhere by the aid of a hot scalpel or needle, and embedded in position by running over it melted paraffin in drops from the end of a hot rod. Care must be taken to avoid bubbles. Anyone familiar with embedding of tissues will quickly grasp the idea. A black spot may be painted in the first instance in the middle of the paper iris, or better still a suitable black glass bead is laid on its centre, before the heated paraffin is dropped on to form the cornea. Having suitably rounded and

smoothed off the corneal area, the work is complete. The shell tends to become more translucent with use. A plaster cast of this paraffin shell is now made so that others can be supplied, if required. The paraffin shell is apparently non-irritating and beautifully smooth, it retains its shape well, certainly for several months and probably much longer. This procedure enables one to give the patient at once a moderately reasonable appearance, maintain his socket in good order, and at the same time to send away an accurate model with the necessary details to enable the manufacturer to construct a suitable prosthesis.

TWO INTERESTING CASES OF POST-TYPHOID SEQUELÆ.

By Dr. A. BAYLEY DE CASTRO,

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THE following two cases of post-enteric complications are, I think, of sufficient interest to justify publication. They are also far from being common sequelæ.

Case No. 1.—The first was a case of a left parotid abscess in a female patient. Her history was of fever of a month's duration with a persistent diarrhœa of loose yellow motions, constant headache, anorexia, and a feeling of extreme lassitude. The first period of her illness was characterised by high fever, and for four days, as stated by the relatives, she had been delirious. Five days before coming into hospital the temperature again started to rise, and the left side of the face swelled up.

The patient on admission (12th September, 1924), was in a very low condition, and also presented an extreme degree of emaciation. The tongue was encrusted with a hard, dry, brown deposit, and sordes were present on the lips and teeth. The breath was foul, pulse weak and thready, and during sleep subsultus tendinum could be detected. The swelling on the side of the face was hard and brawny, with a small fluctuating area between the angle of the jaw and the ear on the left side. The urine was turbid and had a trace of albumen. Nothing was ever detected in the lungs, and the heart, although weak, was normal in rhythm. The Widal reaction was + 1 in 20 to *B. typhosus*; while Marris' atropine test was also positive. This is a point worthy of note, indicating the possible value of the test at a much later date than that advocated, or if we take a 1 in 20 dilution to be so very weak as to lead to the exclusion of typhoid, then the atropine test can be stated to be positive in other infections besides typhoid.

Two days after admission the abscess pointed sufficiently to call for surgical interference, and a few days after the patient started to recuperate and was finally discharged from hospital on the 9th October, 1924.

Case No. 2.—The second case, which unfortunately proved fatal, was that of an abscess of the spleen following a long and protracted course of enteric fever.

The patient was a young Burman of 25 years who before admission to hospital for paratyphoid A. on 1st September, 1924, had had the following previous admissions; for malaria 4, indigestion 1, climatic bubo 1.

On the day of his last admission he presented a very lethargic expression, looked weak, had a small pulse and an enlarged spleen and liver, the former being one inch below the umbilicus, and the latter $\frac{1}{2}$ inch below the right costal border. His temperature for the first four days was of malarial type, but after that assumed

a step-ladder character, and with this the pulse showed a disproportion to the temperature. No malarial parasites were found in the blood. On the 10th day of illness Marris' test was performed and found to be strongly positive, and on the 14th day the Widal reaction was positive to paratyphoid A up to a dilution of 1 in 120. By now a very typical and persistent diarrhœa had set in, and the patient was getting weaker daily. On the 23rd day of illness the temperature had come to normal, and after that assumed a remittent character. No bronchial symptoms ever developed, anorexia was replaced by hunger, but digestion was so very poor that no solid food of any kind could be given. The hepatic enlargement had by now disappeared, but not so the enlargement of the spleen, which was very tender to palpation. On the 2nd October, 1924, the temperature again started to rise up to 102° in the evenings and 100° in the mornings, and the patient started to emaciate rapidly. A blood count showed 78 per cent. of polymorphs. On the 10th October the slightest and lightest palpation of the spleen elicited excruciating pain and the patient's expression began to become pinched, whilst a dilatation of the left ventricle of the heart was also detected. A total leucocyte count gave only 7238 per c.cm., and the hæmoglobin index was 45 per cent. On the 12th an exploring needle was put into the spleen but no pus struck, for reasons to be explained later; and this disappointed me much as I was very sanguine of the diagnosis by now. The little exploring caused a good deal of collapse. By evening the patient had become delirious, pulse 156, fast and small, and at 4 p.m. on the 13th he died.

I shall only touch on the most noticeable features of the post-mortem examination as regards the spleen. This organ was firmly bound down on all sides by dense and strong adhesions. When removed it weighed 4½ lbs., and was 9 inches in depth. This explains why the exploring needle never entered the abscess cavity which was situated at the hilum and extended backwards. The part of the organ not affected by the abscess formation was a solid, hard, fibrous mass.

These two cases constitute the first two of abscess-formation following enteric fever which I have encountered in my experience of very many years.

AN UNUSUAL CASE OF MALARIA.

By V. N. DEUSKAR, L.C.P. & S., I.M.D.,
Indian Station Hospital, Ahmedabad.

At 2 p.m. on the 14th September, 1924, I was called to attend a patient suffering from severe abdominal pain. She was a strong, well-built Punjabi lady, aged 26, and not pregnant. She had been in good health until 10 a.m. that morning, but when seen was suffering from restlessness and severe abdominal colic. The onset of illness had been sudden, with vomiting and pain in the epigastrium and hypochondrium. Constipation was present, but the severity of the pain was out of all proportion to the degree of constipation present.

She stated that seven years previously she had had an exactly similar attack with urticarial rashes all over the body, which had lasted for a day and had then been relieved by injections. She was certain that this rash would recur. Her temperature was 100.2°, pulse 100, respiration rate 20.

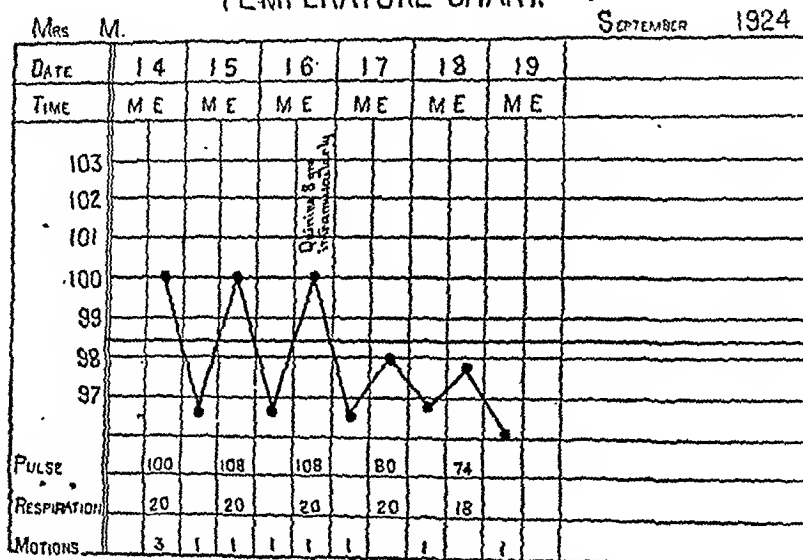
A hypodermic of morphia was given at once, followed by an ounce of castor oil and a hot water bottle locally. She passed two good motions subsequently, and by the evening was in a comfortable condition.

On the 15th September I was again called in at noon, as the symptoms had all recurred. Severe colic had set in at 11 a.m., whilst the patient was covered from head to foot with an urticarial rash, with intense itching and burning sensations. The temperature was 100.2°, pulse 108, respiration rate 20. Thorough examination failed to reveal the cause of the colic, and the abdomen was perfectly soft and not rigid anywhere. No signs of disease could be elicited in the chest, whilst renal colic was out of the question. I had to be content with a diagnosis of gastric neuralgia, and gave morphia, a sinapism, together with calcium chloride and magnesium sulphate for the urticaria.

dramatic. The rash disappeared during the night, whilst there was no recurrence of the colic the next day. The patient was subsequently put on to euquinine, 30 grs. daily for one week, followed by 10 grs. daily for two months, and by the 18th September was in good health.

The interesting features of the case are, first the rash,—this being the first instance in which I have seen an urticarial rash associated with malaria; secondly, the severe and intense abdominal colic, which confused the diagnosis, but which yielded at once to quinine administration; thirdly, the very marked quotidian recurrence of the symptoms, so characteristic of malarial neuralgias. Fourthly, and most important of all, the necessity for routine examination of the blood in all cases of fever of undiagnosed origin, no matter what the cardinal symptoms and the temperature chart may be. The chart in this case was as appended. To quote

TEMPERATURE CHART.



By the evening she was again in a condition of comfort.

The next day, I was surprised to be again called in to see the patient at almost the same hour. Her symptoms were again as before, but, in addition, there was much pre-cordial distress. Not knowing what to do, I called in Capt. F. Griffith, I.M.S., D.T.M. (Cal.), officer commanding the Indian Station Hospital, Ahmedabad, who suggested examination of the blood.

On examination of stained blood films a mixed infection with benign and malignant tertian malaria was found, the former parasite being found in all its phases of schizogony. A differential count of the leucocytes shewed 55 per cent. of mononuclears.

The diagnosis having thus been established, I gave 8 grs. of quinine intramuscularly the same evening, followed by 30 grs. of quinine in solution the next day, the first 20 grains being taken before 11 a.m. The result was

from the editorial in the *Indian Medical Gazette* for last July, on "The Seven Scourges of India"; "the diagnosis of malaria depends, not upon the whim of the physician, nor upon 'clinical' tests by the administration of quinine, but upon finding the parasites concerned in blood films taken from the patient."

STRICTURE OF THE ILEO-CÆCAL VALVE, AND HYPERPLASIA OF THE CÆCUM FROM TUBERCULOSIS.

By ERNEST F. NEVE, M.D., F.R.C.S.E.,
Senior Surgeon, Kashmir Mission Hospital, Srinagar.

Mrs. V. M., a Hindu lady, aet. 30, was admitted on June 6th, 1924, suffering from pain in the right iliac region. There was a history of diarrhoea and occasional vomiting. Owing to this and the pain after meals she was living on a greatly reduced diet. On examination a movable tumour, hard and tender on pressure, was found in the right iliac region.

Without any preliminary treatment, a 4 inch Battle's incision was made. This revealed a matted mass of adhesions round the cæcum, which was a solid mass about the size of an orange. After separating adhesions I resected the cæcum and did lateral anastomosis of the ileum to the lower end of the ascending colon. The operation was greatly facilitated by the emptiness of the ileum, which was remarkable as there was almost complete obstruction. The cæcum consisted of a mass of fibrous tissue. The cavity was almost obliterated. There were signs of old ulceration and a small aperture like the slit in a child's money box indicated the position of the contracted rigid ileo-cæcal valve.

There were numerous enlarged mesenteric glands and unmistakable evidence of local tubercular peritonitis.

The patient made a good recovery. The temperature was normal on the second day, rising in the evening to 100.2° , with a pulse of 100. It was 96° before the operation. After the 6th day there was no evening rise of temperature and the patient was dismissed on June 30th quite convalescent.

Remarks.—This is the second case of the kind which I have seen. The first, seen by me in consultation when travelling in India, I advised to go home, where she was operated upon by a well known surgeon, who, basing his opinion on a pathologist's report, wrote to me, after excising the cæcum, saying that he feared the case was malignant. The lady is alive and quite well more than ten years after this verdict was passed!

It is important in these cases to have an empty bowel if possible. Lateral anastomosis, although taking twice as long, is I think more secure. In any case reinforcement with omentum is wise.

TWO CASES OF TUMOUR OF THE OVARY.

By S. C. DAS GUPTA, L.M.S. (Cal.),
Senior Surgeon, Bir Hospital, Katmandu, Nepal.

THOUGH ovarian tumours are not very common here, yet I have recently seen two cases of ovarian tumour of very large size, within four weeks.

Case 1.—Hindu female, aged 35, mother of three children, gave a history of one year's duration of the growth. For nearly a year she had been regarded by her relatives as pregnant, but as she gave no signs of delivery at the expected period, she was brought to hospital. The growth had first appeared on the left side and had gradually filled the abdominal cavity. On examination, there was a hard, solid mass in the left lumbar region, a dull percussion note both in front and in the flanks, resistant bulging in the left lateral fornix, with sinistro-flexion and non-enlargement of the uterus.

On opening the abdomen a large quantity of thick mucilaginous fluid poured out, and the tumour had to be tapped in order to reduce its volume prior to delivery. The adhesions were few and soft, and the pedicle gave no trouble. The patient made an uneventful recovery

and was discharged from hospital five weeks later. I heard subsequently that she gave birth to a healthy



CASE 1.—After operation.



CASE 2.—Before operation.

child 13 months after the operation. On section, the tumour proved to be a cysto-adenoma with several cavities inside filled with a clear, semi-solid gelatinous fluid. Photograph No. I shows the patient after recovery, with the removed tumour beside her.

Case 2.—Hindu female, aged 27, nullipara, gave a history of a gradually increasing painful swelling of about four years' duration. She was extremely weak and emaciated and could not even walk a few steps without support. The abdomen was uniformly enlarged, but the portion below the umbilicus appeared the most prominent. The percussion note was dull everywhere,



CASE 2.—After operation.

and a thrill was palpable at the sides and even at the posterior fornix per vaginam. On bimanual examination neither the uterus nor ovaries could be felt.

Operation necessitated a preliminary tapping of the cyst, and a huge unilocular cyst was disclosed, filling up the whole of the abdomen and going down into the pelvic floor. Incision from the xiphoid to the symphysis pubis was necessary, and the cyst was adherent on all sides and to almost every organ in the abdomen, the adhesions being strong and vascular. The omentum was adherent and bits of it had to be removed with the tumour, which was also adherent to the sigmoid flexure, the caecum, appendix and posterior portion of the uterus. During the extensive dissection which resulted, a gushing sound became audible, synchronous with inspiration, and it was discovered that this was due to entrance of air through a minute tear in Douglas' pouch. The vagina, which had been douched prior to operation, was therefore packed with moist iodoform gauze.

Twice during operation the patient almost collapsed, and 1 c.c. of pituitrin was given on both occasions, whilst two pints of normal saline were given intravenously. After closing the abdomen, the patient was kept in Fowler's position for six days, and regularly catheterised for three days. There was a good deal of pain, and morphia had to be given. The wound healed by first intention, and the patient left hospital six weeks later. Photographs Nos. II and III shew the patient before and after operation; in the latter the removed tumour is shewn resting on a basin beside the patient.

A CASE OF STRANGULATED HERNIA.

By SHAMBHU NATH MISRA, RAI BAHADUR,
Civil Surgeon, Bulandshahr.

An old man of 92 years of age, Mahomedan by caste, came to hospital at about 10 a.m. on the 22nd September, with the following complaints:—

(1) Hiccough. (2) Vomiting. (3) Having passed no motion or gas for the last five days. (4) Extreme excruciating pain in a small melon-like tumour over the right inguinal region. This was hard, irreducible, dull on percussion and hot. On enquiry it was found that he had been subject to right inguinal reducible hernia for the past 20 years or so.

Present State.—The patient was a thin, weak, emaciated man with slightly coated moist tongue, temperature 100°F., pulse small and rapid, and 100 a minute. The bowels had not moved, nor had he passed any flatus; he had vomited bile several times, fortunately it was not stercoraceous. The patient and his relatives were informed of the nature and the gravity of his condition. It was decided to operate on him at once. Some time was spent in getting the necessary instruments and appliances sterilized; the patient was then put under chloroform and Bassini's operation was performed under full aseptic precautions, for assistance in which I am indebted to my Assistant Surgeon Sardar Chanan Singh Saheb.

The patient made an uneventful recovery with no rise of temperature and the wound united by first intention. The stitches were removed on the 10th day and the patient was discharged cured on the 14th day. The case is of interest in the following features:—

1. A very old man, practically in a moribund condition.
2. On cutting the strangulating band and opening the sac, the bowels were found cyanosed and much sanguineous exudate was found. The whole hernia was returned to the abdominal cavity and the parts were interfered with as little as possible. The sac was adherent in its lower segment and the adhesions were very strong and hence the adherent portion was left *in situ*. Luckily the whole of the exudate appears to have been absorbed and the bowels began to work, as the patient passed a motion and flatus just after coming round from the anæsthetic.
3. Hiccough continued for three days after the operation. Sodium bromide with chloral hydrate in homeopathic doses were administered and served the purpose very well.
4. For four days nothing but a little warm water was given to quench the thirst.
5. In this particular case, the patient was without nourishment in any form except water for ten complete days and on the 11th day he

was given a very little milk mixed with water and lots of fresh lime juice separately.

6. The above state of affairs shows clearly that, if surgery is properly done under strict aseptic precautions, one can save life, even in such advanced cases.

A CASE OF PULMONARY EMBOLISM.

By S. SERHACHAR,

Sub-Assistant Surgeon, Mulbagal, Mysore State.

THE patient, a woman aged about 27 years, had a normal labour of about five hours' duration. The puerperim was quite normal, with no rise of temperature, no sepsis, and the lochia were healthy; but the uterus did not appear to involute properly, and on the seventh day the fundus was still palpable just below the level of the umbilicus. So, in addition to such other measures as adopting the completely recumbent posture and a firm binder, etc., an injection of 1 c.c. of "Hypoid" pituitrin was given hypodermically.

Within three minutes of the injection the patient began to cry out with intense and sudden pain of a stabbing character in the right side of the chest and back. She sat up in bed, complained of orthopnoea, became pale in the face and seemed terrified. The pulse, which had been of normal tension and 63 to the minute, now became irregular and reduced to 40 to the minute. After some 20 minutes of acute suffering she was spontaneously relieved of her agonising symptoms. Simultaneously with the commencement of the pain in the chest there was a discharge of bright red blood from the uterus, and clots were found on the diaper.

The whole of this day the patient felt weak and exhausted, but otherwise normal, and subsequently the uterus involuted rapidly.

One presumes that the sudden rise of blood pressure, following upon the injection, had dislodged clots occluding the orifices of some of the vessels in the uterine wall, and had caused air embolism of the right pulmonary artery. Possibly the dose of pituitrin given was too large, or it was too late in the puerperim to give such an injection?

A CASE OF TRAUMATIC PTOSIS.

By P. B. KARKAREY, M.B.,

Nagpur, C. P.

A BOY aged 15 years was brought to me for consultation, suffering from unilateral ptosis of the right eye, of duration of some 14 to 20 days. On examination of the affected eye, a linear scar was found, just on the supra-orbital ridge. This had been caused by a pet deer, which the boy had been feeding, and which raised its head and accidentally struck him near the inner canthus of the right eye.

The horn had slipped over the supraorbital ridge, causing a clean cut of the skin and the levator muscles. The cut had been treated by a local doctor in the village and had healed.

The parents were advised that operation—so far from doing good—might possibly do harm. As the patient insisted on treatment of some sort, however, silvol eye drops were prescribed, and he was instructed to massage the lids, and to make every effort to improve the tone of the injured muscle. He was told that the condition would probably become entirely cured with time.

Ten days later the ptosis was very much less, and later disappeared. My reasons for publishing this note are first to draw attention to trauma as a possible cause of unilateral ptosis—as I have not been able to find any reference to such a cause in the literature; and secondly to point out the fact that in such a case as this operation would probably have done more harm than good.

CALCIUM LACTATE, A PREVENTATIVE OF STILL-BIRTHS?

By DAVID PERERA,

Poonagalla Group Hospital, Koslanda, Ceylon.

WALLIAMMA, aged 32, the wife of a Kanakapulle on this estate, had given birth to eleven children, with the following histories:—

Her first child is a male of 14 years, still living.

The second, a male child, was born dead at the 9th month.

The third also had the same fate, at the same period.

The fourth, a female, was still-born at the 7th month.

The fifth, a female, is still living, and 8½ years of age.

The sixth, a male, is still living, and 7 years of age.

The seventh was a female, and died three months after birth.

The eighth was a male, still-born at the 9th month.

As she was then very anæmic and suffering from ankylostomiasis, at this period I treated the latter disease, and followed this up by a full course of iron tonics.

The ninth child, however, was also still-born at the 8th month.

The tenth child, a male, was still-born at the 9th month.

When she became pregnant for the twelfth time, I gave calcium lactate, 10 grains twice daily, from the 6th month of pregnancy until the birth of the child. The patient stated that her general health in this pregnancy was far better than ever before, and she gave birth to a healthy female baby on the 5th September, 1924, without even the assistance

of a midwife. The child is still living and in good health, though small in size. The mother is also in good health, but as the maternal milk is deficient, the child is being reared on cow's milk.

SPECIAL ARTICLE.

RECOLLECTIONS OF THE CALCUTTA MEDICAL COLLEGE FORTY-FIVE YEARS AGO.

By an OLD MILITARY MEDICAL STUDENT.

The death of our beloved professor Colonel Kenneth McLeod, reported last year by the *Statesman*, carries one's memory back across a gap of nearly fifty years to the Calcutta Medical College of those days.

The revolutionary changes which medicine and surgery have undergone within my recollection have been accompanied by such changes in the manners and customs of Europeans in Calcutta, that I hope that these rather disconnected reminiscences may not be devoid of interest to the present generation.

Buildings.—The hospital buildings have changed less than might have been expected. There was only the stately old pile which stands to-day and in it all the patients, medical, surgical and obstetric, European and Indian, were housed. To the north of it was a lawn, where the Ezra and Eye Hospitals now stand and to the south was the students' playground as at present. The quarters of the Principal and Resident Medical officers are still the same and the apothecary, as he was then called, lives where he did in my time. The old museum stood on the site occupied by the present building, but nothing now remains of the former Medical School buildings. To the west of the Principal's quarters stood the two lecture theatres and next to them was the Chemical Examiner's laboratory, a long single storey building. Still further west was the military students' range and the Police Mortuary, adjoining Coisootia Street. The Eye Hospital was on the latter road and the Eden was being built, as was Chuni Lal Seal's Dispensary.

Initiation.—The session used to begin on the 15th June and I joined as a military student in the year 1880. I was cordially received by the older students in the military students' range, which stood on the site now occupied by the Pathological Department. I was given a hearty breakfast, doubtless to disarm any suspicions I might have as to what awaited me. After this two stalwart students armed with thigh bones conducted me before a tribunal seated round a table, under which I spied a heap of boots and shoes and an enema syringe. I was asked many questions, but the most important one was whether I was willing to pay my footing of Rs. 4 and abide by the established rules of the students' range. On giving my assent, I was congratulated and marched out, but was betide the bold freshmen who refused. Our students' tribunal, like that of the Holy Inquisition, understood the moral effect produced by an examination conducted in sight of the instruments of torture, and the horrid suggestion conveyed by the articles I had glimpsed under the table doubtless helped many a timid one to make up his mind. If still recalcitrant, the tribunal was quite prepared to resort to extreme measures in the interests of discipline.

The major portion of the footing money went to a fund for starting a gymnasium, but a small fraction provided refreshments for the celebration which took place when all the new students had joined. This consisted of an afternoon "at home." Every freshman had to sing a song or make a speech, standing barefooted on a table whilst two students beat time on his toes with the heels of boots. The less the song or speech was

appreciated, the harder and faster the beating of time on his toes went on, until a sudden drop off the table on to the floor signified that the audience had had enough. Nevertheless, the freshman was held to have qualified to enter the ranks of the military medico's fraternity.

The Staff.—The composition of the teaching staff has not changed materially. The number of professorships held by I.M.S. officers was the same as now, with the exception of the professorship of pathology, which was then held as a collateral charge by the Resident Physician. Dr. John Martin Coates, whose death under tragic circumstances will be referred to later, was the Principal and Professor of Medicine. Dr. Kenneth McLeod was the Professor of Surgery and Dr. Daniel O'Connell Raye was Second Surgeon and Professor of Anatomy. Midwifery was taught by Dr. Charles and later by Dr. Harvey, who afterwards became Director-General, I.M.S., whilst Dr. R. C. Chandra was Professor of Materia Medica. These were the most notable members of a staff, all of whom have left reputations likely to endure for long in India. Their portraits, in the costume of a bye-gone generation of medical men, adorned in many cases with luxuriant beards or "Dundreary weepers" still hang in the professors' room at the Medical College.

In addition there were two demonstrators of anatomy and the usual staff of house surgeons and house physicians. The apothecary, the dispensary officer and the obstetric house surgeon were members of the I.M.D.

There were two European sergeants, Connolly and LeMott. The former was in charge of the instruments, and the latter who, though small in stature, had the heart of a lion, was responsible for the maintenance of discipline amongst the patients, no light task when, as often happened, he had a "rough house" of drunken sailors to handle. He carried a bludgeon as big as himself and superintended the treatment of alcoholic cases. This process was simple but efficacious, a blistic poured water over the patient from a height out in the open, and whether it was the soothing influence of the cold water or the menacing flourish of his baton which effected the cure I am not prepared to say, but I do know that this little bantam never failed to reduce the most obstreperous Jack Tar to submission.

Then there was the European matron, Mrs. Bowler, who presided over the maternity ward, and last but not least the nurses. These latter were portly dames of mature years, who wore no uniform, but carried a fan as a badge of office. They underwent no regular training and passed no examinations; all that came later with the advent of the Clever sisters. They picked up their work somehow and their main duty was to oversee the ward servants. Many of them were comely enough and I well remember one youthful widow who was a veritable magnet to the susceptible military students.

The Wards.—The First and Second Surgeons were in charge of a ward each of Europeans and Indians, likewise the First and Second Physicians. There was one ward for maternity cases in the upper storey to the extreme west under the Professor of Midwifery. Each of these five professors had a passed student of the College as house surgeon or physician. The accident ward was under the main staircase and occasionally cholera cases were admitted to it, but they, poor wretches, did not trouble us for long; there were no saline injections in those days and all but the mildest cases were soon claimed by the undertaker. The operating theatre was on the first floor and next to it was the instrument room, where dwelt Connolly, who put in most of his time cleaning and polishing the instruments, an easier task in those days than it is now. He had not to contend with the corroding and blunting action of boiling water, and his shining razor-edged knives were a joy to see and to handle, which is denied to the modern surgeon. The dispensary was in the basement facing south, and the present flight of steps on that side did not exist. Small-pox cases all went to the Campbell

Hospital, which had been started a few years before to accommodate them, and plague was non-existent in those days.

In the medical wards the days of bleeding and drastic purging had passed, and except for the absence of clinical pathology, of vaccines, sera, of synthetic preparations with outlandish names and of endocrine therapy, the work did not differ greatly from that of the present day. But in the surgical wards what a difference! Aseptic surgery was as yet unborn and the use of antiseptics was still in its infancy. Wire baskets filled with lumps of charcoal were suspended in all the wards and were supposed to act as germicides, deodorants and miasma absorbers. We spoke of "laudable" pus in those days and saw it too, for practically all major operation cases suppurred freely. Our two exponents of surgery, of whom one hailed from bonnie Scotland and the other from the emerald isle, were at variance with each other over this question. The Second Surgeon had no faith in Lord Lister's doctrine, whilst the Professor of Surgery was an ardent convert. The method was so simple and convenient. It consisted of spraying carbolic lotion by means of a hand spray resembling a lady's scent spray in the near vicinity of the part which was being operated on or dressed. Later a spray worked by steam was used for operations and distributed the lotion over a wider area. The idea was to purify the germ laden air around the part. We did not have all the trouble of sterilising the patient's skin and the surgeon's hands, nor the complicated ritual for the preparation of instruments, ligatures and dressings which the student of to-day has to master. Undreamt of too were the ghost-like objects with cap, mask, gown and gloves who now move delicately about the theatre with hands uplifted for fear they touch anything unclean. We just took off our coats, rolled up our shirt sleeves, washed our hands and were ready for anything from threading needles to lifting the patient. We only clipped our nails when they got so long that we hurt our fingers when pericussing, unless social convention demanded that the operation was performed oftener. The effect of the spray was wonderful. When we had yard upon yard of pus-laden bandages and dressings to remove, or when pus poured out of a pocket in a stump bringing the sutures away with it, we believed that the system was being purged of effete matter, which was better out than in, and so long as the granulations at the end of the stump were nice and pink, we were taught that all was well. Comforting as this was, it did nothing to palliate the offence to one's olfactory organ and we often used to wonder why, if Nature could sometimes heal a wound without all this unpleasant smell, she could not always do so. The spray was brought into use and acted like magic. It was not certain on what it acted, but what we did know was that we did not have to hold our noses when we went into the professor's wards, as we had to in those controlled by the exponent from the emerald isle. The latter was no believer in sprays and still relied on the virtues of the charcoal baskets, but even we were beginning to lose faith in them, and the contrast in the odours of the two sets of wards shook our faith in what he taught us.

Surgery in those glorious days was delightfully easy and we disposed of a dozen cases in the time taken by the present-day surgeon over one. For instance, if a surgeon saw a man waddle into the surgical out-patient room with something dangling between his legs like a sporran, diagnosis and treatment followed swiftly. A grab was made at the tumour while the patient was trying to explain, a trocar was plunged in, fluid evacuated, iodine or carbolic acid injected, the sac well shaken up and the puncture given a hard pinch to seal the hole, all in less time than it takes to tell. The patient went on his way rejoicing at the restoration to usefulness of an organ which he had not caught sight of for some time and spread abroad the fame of the hospital where a radical (?) cure had been effected so speedily. Acupuncture was in fashion in those days

and sometimes effected equally dramatic cures. I have seen a patient brought in crippled with sciatica, who took up his bed and walked after a long needle had been plunged into the sciatic nerve and left there for half an hour.

The scope of the operative work was of course much more limited then. The only abdominal operation I ever saw was the removal of an ovarian cyst performed by Dr. Harvey, which was said to have been the first ever attempted in India. The patient died and at the post-mortem examination next day internal hæmorrhage was found to have been the cause of death. Another case was brought on to the operating table, but just as the operation was about to begin it was decided that the tumour was an enlarged spleen and therefore better left alone. I also remember seeing a large cyst tapped by the vaginal route. Colonel McLeod's strong points were hernia, stone in the bladder and scrotal tumour, the latter sometimes nearly as big as the patient and taking months to heal by granulation. He improved on Wood's old operation for hernia and his cases did not recur. I remember one case of cancer, for which he removed the tongue and most of the lower jaw. The man could not speak, so a reed with a slot in the middle was inserted, which enabled him to mumble in a monotone. Mr. Woods, the dentist, made him an artificial jaw of silver, which was a great success, but the rascel sold it and came back for another—which needless to say he did not get. There were no Sisters or special nurses to fuss around the patient and tell him how brave he had been. No, this was men's work, and females were regarded as out of place in the operating theatre, as they were supposed to be likely to scream or faint at the dreadful sights.

McLeod was a clean, quick operator, always ready to act promptly in an emergency. His students had to anticipate his wants at operations and carry out orders at the double. He was one of the pioneers of antiseptic surgery in India and was a born teacher and ruler of men. Tall and strikingly handsome, with a ready smile for a student and a kindly sympathetic manner, even if sometimes sarcastic, he was always the dignified, courteous gentleman, who could command respect and obedience from the most turbulent class. He was a fluent, witty speaker, whose name was always on the toast list at the St. Andrew's dinner. His memory was remarkable, he knew all his students by name and studied their interests. At a lecture a student once drew a caricature of him; his watchful eye noticed the diversion, the student was called up and the picture examined. With a quiet smile he said "highly artistic, but not surgical." Such was Kenneth McLeod. His portrait in the Medical College is a speaking likeness, his vigorous personality is written on every line of the handsome face and it is no wonder that he inspired such affection in his students, an affection which endured long after they had left the College.

Manners and Customs.—The Britons of those days were tough fellows who defied sun and rain in their service of the conventions. The professors always appeared in dark suits and small bowler hats and one of them was never out of a morning coat, which was always considered the correct costume for lecturing. Stiff starched shirts and collars were worn at all times, regardless of the heat and often necessitated three or four changes of shirts in a day. Tall hats and frock coats were *de rigueur* at church, in the Eden Gardens and at all fashionable gatherings, a custom which has only lately died out and even now is still observed by certain very exalted officials. The light suits and soft shirts of the present-day would have been regarded as most unbecoming and unprofessional, and I shudder to think of what would have been said to the proposal recently put forward that shorts and shirts should be the day wear for business men.

The horse was the only means of conveyance, but in those days there were no phaetons available for hire, the only public carriages were second and third class

bund-gharries and *palkies* carried by four bearers. The well-to-do doctor was known by his brougham and pair of horses, and the stable which a busy man had to keep up was prodigious. One professor had a miniature caravan in the form of a brougham, with relays of a dozen or more pairs of horses at different parts of the town. If a conveyance came thundering down on you in the street like the present-day fire brigade, with two lusty syccs roaring warning to the unwary pedestrian, you knew it was the Professor of Midwifery going to a case, and jumped aside to let him pass. Doctors were not proud in those days and did not disdain to use the humble third class *tikka-gharry* when summoned in haste to a case. I was walking quietly along one day, when a *gharry* approached me at top speed, the Jehu urging his steeds with whip, rein and tongue. Round the corner it came at such an angle that it would surely have overturned, had it not been steadied by the weight of three portly semi-nude gentlemen seated inside it. As it flashed past, I saw wedged in amongst the occupants with his legs dangling out of the window, a figure with a grave face and a bundle of papers under one arm. It was the Principal, Dr. Coates, going to an urgent case. This professor too loved his "*la-ads*" and was beloved of them. He had hardly retired to enjoy a well-earned rest when the wires flashed a message across the seas from a *rani*, an old patient, to come. He came, but at what a cost: the case over, he was on the point of returning to England, when he fell a victim to cholera and died in Sealdah House, the residence of his son-in-law, Dr. Gibbons.

Recreations were scanty in the eighties, badminton was the only game played, and riding or driving on the Red Road or walking in the Eden Gardens appropriately attired were the usual relaxations. We students often used to go there in the evenings and one familiar figure on the famous Red Road is recalled to my memory whenever I go there. A smart lady on a spirited mount, followed by a sumptuous barouche and pair, in which sits a courtly and courteous gentleman, who does not disdain to return the humble salutation of a student. It is Dr. Chandra, the Second Physician and one of the first Bengalees to be appointed to the staff of the Medical College.

Hardly less popular than Dr. McLeod was Dr. O'Connell Raye, the Professor of Anatomy and Second Surgeon. Spare and of medium height, always very smartly dressed in the height of fashion and never without a flower in his buttonhole, he was a complete contrast in appearance and in every other way to McLeod. His manner was quiet and unassuming, he was very patient and painstaking in his operations, and took endless trouble over the teaching of the students, with whom he was a great favourite.

Dr. Coull McKenzie, the Professor of Medical Jurisprudence and Superintendent of the Campbell Hospital, was another of the bushy-bearded ones who, like most lecturers on that subject, had a great fund of highly flavoured anecdotes. They were all good fellows. Here's to their memories!

Current Topics.

Chlorine Inhalation in Respiratory Infections.

Much attention has been given to chlorine as a remedy for respiratory infections.

Vodder and Sawyer liberate 146 c.c. of chlorine in a room of 1,000 cubic feet; after half an hour liberate 500 c.c.; again after three quarters of an hour they liberate 250 c.c.

The chlorine is discharged from a small cylinder of liquid chlorine, the gas being measured by passing it

through a glass cylinder filled with salt solution. The gas is discharged in successive amounts of 30 c.c.

The patient inhales the chlorine for an hour. Colds, influenza, etc., have been treated with great success.

Immunity against Malaria.

LIEUT.-COLONEL S. R. CHRISTOPHERS, I.M.S., has a very important article on this subject in the *Indian Journal of Medical Research* for October, 1924. This should be read by all who are interested in malaria. The conditions prevailing in a hyper-endemic area in Singbhum District were closely studied and it was found that while the percentage of infection was very high (87 to 100 per cent.) in persons resident from one to ten years in the area, there was a great variation in the intensity of the infection and of the symptoms.

The parasites in indigenous infants and in non-immune new comers rapidly reached an average of over 10,000 per c.mm. after one year of residence and then fell to about 1,000 per c.mm. after three years. The higher counts of over 10,000 seldom persisted longer than two years. This period is called that of acute infestation and attack conditions of malaria are practically continuous. Then comes a period in which the parasites are much fewer, some degree of immunity is established, only occasional attacks occur, and this period is called that of immune infestation. In this stage a very high proportion of the children show parasites, so that the parasite index would indicate as high a prevalence of the disease as among the children in the period of acute infestation. This period of immune infestation goes on till adult life and the persons in this stage of infection are immune to severe malaria. New comers up to the age of five go through the same periods of infection as children born in the area, but after the age of five the new comers who were examined were not susceptible, possibly because of some degree of previously acquired immunity. The size of the spleen was not specially great during the period of acute infestation, averaging only about 5 cms. of projection beyond the costal margin, whereas in the period of immune infestation larger spleens were encountered and the average size remains much the same as in the period of acute infestation.

The number of crescents found in the blood was roughly in proportion to the number of asexual parasites, so that the children in the stage of acute infestation harboured a far larger number of crescents than the children and adults in the stage of immune infestation, the proportion found in the two groups being 2,095 against 132.

The aboriginal tribes showed no racial immunity, but when they live in hyper-endemic areas they become "salted" or immune after a period of intense infestation.

Intramuscular Injections of Quinine and Other Drugs.

(*Indian Journal of Medical Res.*, October, 1924).

MAJORS H. W. ACTON and R. N. CHOPRA, I.M.S., of the Calcutta School of Tropical Medicine have conducted important animal experiments on this subject. They find that the bihydrochlorides of quinine, quinidine, cinchonidine and cinchonine when injected in the usual strengths into the muscles of rabbits caused oedema, irritation and necrosis of the tissues. Contrary to the usual belief, there was little difference in the action of cinchonine as compared with quinine. They go so far as to say that the injection of these alkaloidal salts into the muscles of man should be considered as malpraxis, and that "there is only one method of administering the cinchona alkaloids and that is by the mouth."

"Very rarely in grave cases quinine base should be injected intravenously."

Without going quite so far as the authors in their condemnation of intramuscular injections of quinine and

cinchonine, we are of opinion that this method should be reserved for cases in which there are good and sufficient reasons, such as persistent vomiting or failure to absorb the drugs. The proportion of cases in which serious consequences follow in practice from intramuscular injections is small, but is large enough to justify us in reserving the method for those cases in which there is a real necessity for the procedure.

The Nature of Diabetes Mellitus.

Jl. Amer. Med. Assocn., Vol. 83, 1924, p. 1423.

AN important paper by Dr. Cammidge of London raises the question of the real nature of diabetes mellitus. The prevailing view appears to be that the disease arises from pancreatitis and that any form of glycosuria which arises from non-pancreatic causes is not true diabetes.

We are faced with the old problem of giving an accurate scientific definition to a name which was used in a loose and unscientific manner for generations, and it is evident that the time has not yet arrived when it is possible to give a final definition of the term diabetes. We must continue to regard diabetes as a symptom, and the only scientific procedure which is permissible at the moment is to define the conditions of which it is a symptom.

The discovery of insulin has been regarded as evidence of the unity of diabetes, because all forms of glycosuria yield to the drug. Cammidge argues that any form of glycosuria produced experimentally will yield to insulin even if the pancreas be intact.

It is not possible to follow Cammidge in detail through his masterly exposition of the subject, but he states that his clinical experience goes to show that about 38 per cent. of his cases offer evidence of pancreatic deficiency of an absolute degree, 32 per cent. have relative deficiency associated with excessive glycogenesis, while the remainder showed no evidence of pancreatic defect. Cammidge adds that if only severe progressive cases are taken into account, no less than 80 per cent. of them show absolute pancreatic defect.

It would be interesting to investigate diabetes in India from this point of view to see whether the same proportion of the cases falls under these three heads. Clinicians here are inclined to agree that there are two main forms of the disease, one with primary disease of the pancreas, in which the disease runs a rapid course, the other a slow and insidious form occurring in persons who have been guilty of years of physiological unrighteousness, who have eaten carbohydrates to excess and taken too little exercise. In this form it is believed that the glycogenic function of the liver and the activity of the internal secreting cells of the pancreas have been overstrained for a long time; the pancreas is more sinned against than sinning and it breaks down through over work. Eventually the pancreas becomes diseased but only as a secondary measure. Probably there is over production and defective utilisation of sugar. Here is a case in which international co-operation between research workers might lead to valuable results. It is obvious that the prevention and cure of the two distinct forms of diabetes must be worked on quite distinct lines, and a slavish following of the teaching of western scientists may result in erroneous views as to the control of the disease. Cammidge's paper is of exceptional interest to us in India, and it is to be hoped that the lines of thought suggested by him will be worked out here as well as in western countries.

Urea Stibamine.

MAJOR H. E. SHORTT, I.M.S., and DR. U. N. BRAHMA-CHARI have papers on this drug in the October number of the *Indian Journal of Medical Research*. They continue to have remarkably good results, and Major Shortt presents a series of 20 consecutive cases all of which

were claimed to be cured. The standard of cure appears to be microscopical and cultural examinations on the completion of treatment. This result is certainly wonderfully good and it is to be hoped that it will be possible to ascertain the permanence of the cures by following up the patients for a further period of at least six months.

Dr. Brahmachari records a series of eleven cases, all cured by courses of injections lasting from ten to fourteen days. Negative blood cultures at the end of the treatment are accepted as evidence of cure, but here again it is necessary to follow up the cases as it seems to be quite possible that a negative blood culture immediately after the course of treatment may not indicate complete and final sterilization. If so short a course of treatment should be found to be followed by a permanent cure in all cases, the treatment of kala-azar will be reduced to the utmost simplicity.

Urea stibamine has now been tested very thoroughly as far as its immediate effect on the disease is concerned, especially in the early stages. We hope it is not hypercritical to ask for the after results as these are of the utmost importance. Other lines of treatment are held by some to bring about similarly good results, but relapses are reported to be not uncommon. Dr. Brahmachari's next step will doubtless be to publish in detail the process of manufacture of urea stibamine, so that it may be made available for general use at a reasonable price.

Studies in Dracontiasis.

DR. HAMILTON FAIRLEY in the October number of the *Indian Journal of Medical Research* gives a most valuable analysis of 140 cases of dracontiasis. The disease is most prevalent in western Madras and in the Deccan, where nearly 3 per cent. of the population are affected.

Deaths are few, but incapacitation is great; in one village nearly 25 per cent. of the population were off work for about a month every year owing to the disease.

The incubation period is probably about a year. The chief incidence in Bombay is from March to June. Multiple infestations and repeated infestation are common. Some people appear to be resistant owing to the condition of their gastric juices.

The onset is with urticaria, gastro-intestinal disturbances, fainting, giddiness and dyspnoea. These symptoms are followed within a few hours by local signs of the worm in the subcutaneous tissues. These signs are (1) local itching in 81.5 per cent. of cases. (2) A small vesicle which is often ruptured by scratching. (3) A spreading oedema of the part. Sometimes the first indication of the disease is the appearance of a palpable worm (10.8 per cent.).

Urticaria of a general type occurs in about 40 per cent. of the cases. There is often swelling of the eyelids and injection of the conjunctivae. The urticaria lasts for less than $\frac{1}{2}$ to 12 hours in most cases. Half of the patients who have urticaria also have nausea or vomiting. Fever occurs in about 15 per cent. of the cases.

Severe dyspnoea is sometimes seen due to the bronchial oedema. The general symptoms which so often precede the appearance of the worm are believed to be due to some toxic materials exuded by the female worm in the tissues.

Local Lesion.—The blister is from 2 mm. to 7 mm., its contents are clear sterile serum containing leucocytes and embryos of the worm. Aspiration under aseptic conditions is advisable for diagnosis and treatment. The ulcer which follows the rupture of the blister has a central whitish necrotic zone in pink granulation tissue covered with a gelatinous exudate.

The situation of the local lesion was the lower extremities in 86.5 per cent. of the cases, in the others it was the arm, trunk, buttock and scrotum. Secondary bacterial infection occurs with staphylococci, streptococci or colon bacilli. These are usually introduced by

retraction of the stretched worm when it is broken in attempts at mechanical extraction. Acute abscesses are common, cellulitis and buboes may occur. Septic arthritis followed by ankylosis may lead to deformity; calcified worms may persist for years when the worm dies under aseptic conditions. The blood picture is characterized by eosinophilia (about 15 per cent., rarely up to 63 per cent.). With bacterial infection there is naturally a leucocytosis. Tartar emetic was regarded as a failure. The essential point in the treatment of septic cases is mechanical traction of the parasite.

Liver Abscess.

In the *Lancet* of November 15th, 1924, Lieut.-Colonel E. O. Thurston, I.M.S., records his further experience in the treatment of liver abscess. His original publication in the *Indian Medical Gazette* in 1914 did much to make aspiration the operation of choice in India, but evidently other countries have lagged behind and are still content with the barbarous open operation.

The adoption of aspiration in India was due to Sir Leonard Rogers, who pointed out that emetine is capable of controlling the active infection by the amoebæ, and that apart from this there is just as great an objection to opening an aseptic liver abscess as there is to opening a psoas abscess or any other collection of pus which is not infected with septic organisms. To place such abscesses in open communication with the outside air has always been found to be most dangerous, and we have definitely departed from the surgical fetish which insisted that "where there is pus there ought to be an incision." The teaching now is "where there is aseptic pus there should not be an incision unless there is some urgent need or overwhelming indication for it."

Thurston was one of the first surgeons to adopt this rule in dealing with liver abscess, and his results show a series of 64 cases of liver abscess treated on these lines with a mortality of 14 per cent. These figures form the best possible justification of the correctness of the line of treatment which was adopted. Of the cases, 49 were treated by aspiration alone, there were nine deaths among these. Nine cases were treated by incision, cleaning out the cavity with gauze and sewing up the wound in layers. Some of these broke down, but healing was much more rapid than with the open operation, others healed up soundly without complications, all of these recovered. In two cases incision and drainage were necessary, both of these recovered. Repeated aspirations were needed in some cases. In one case nearly 100 ozs. of pus was removed at one aspiration. In two cases drainage after aspiration had to be adopted.

To estimate the results it must be added that all the cases were very advanced or very acute and there was no selection of cases. Most of the fatal cases were of a particularly unfavourable type, two were moribund, two had multiple abscesses, one was a very old man with albuminuria and glycosuria, in fact it is stated that in uncomplicated cases there were no deaths. Thurston regards adequate emetine treatment as an essential part of the operation and in the later cases his practice was to give two grains of emetine hypodermically while aspiration is going on. The injection of quinine or emetine into the cavity has not been found useful. In uncomplicated cases the stay in hospital was a week or ten days during which about six grains of emetine were given.

The economy in time and dressings is an important factor, but the most essential point is the obviation of risk of septic infection. A Potain's aspirator is used, local anaesthesia is preferable, especially in severe cases. The site of puncture is towards the upper part of the abscess, especially in epigastric cases. In abscesses extending down to the umbilicus the point of entry of the needle is from above downwards just below the costal margin because of the rapid upward retraction of the liver which takes place during the operation. When the abscess points, entry

through healthy skin is made when possible to prevent leakage. The wound is closed with collodion on cotton wool. Two bottles are kept ready so that when one is filled the other can be used at once. When the flow shows signs of weakening, an assistant uses the exhaust syringe without closing the stop cock on the tube attached to the cannula. If the flow is checked by debris the trocar or a stylet is inserted.

The cavity is emptied as completely as possible and the wall of the abscess is scathed with the cannula, in this way pockets are sometimes found. The puncture is stitched with one horse hair and the wound dressed with collodion on cotton wool.

Four cases were aspirated and subsequently drained, either because the abscess was obviously septic or because aspiration was unsatisfactory. Only two cases were incised at once, one was a doubtful swelling which had to be explored, another was septic.

In cases with a doubtful swelling in the epigastrium open operation with cleaning of the cavity with gauze and primary suture is regarded as the safest procedure. There were nine of such cases, seven of which healed by first intention.

Two of these cases broke down later, but the results were better than with drainage. Finally it appears that the only indication for drainage is sepsis. It is important to emphasise the correct treatment of liver abscess, for though most workers in India are familiar with this, workers in the other parts of the world and some new comers to India are not aware of the dangers of open operation, which in such a series would probably have yielded a mortality of 60 per cent owing to septic complications which cannot be prevented even with the most elaborate precautions.

Thurston's cases were treated in an Indian hospital in which the patients were anxious to go home at the earliest possible moment; otherwise a longer course of after-treatment would doubtless have been carried out as a single course of emetine cannot be regarded as a cure of the underlying amoebiasis. It seems likely that early cases which are not of a fulminating nature and which are not complicated with some other serious illness are almost invariably cured.

It is obvious that a record like this is of the greatest value, owing to the absence of selection in the cases. Colonel Thurston is to be congratulated on having obtained remarkable results by methods which are capable of being practised by any surgeon even under the unfavourable conditions which prevail in most Indian hospitals.

The Treatment of Empyema.

By W. H. C. ROMANIS.

Practitioner, November, 1924.

THE operation varies with the nature of the organism. When the pneumococcus is found drainage can sometimes be dispensed with, if primary closure fails, no harm is done and drainage can be resorted to. If other septic organisms are present drainage is essential and resection of a rib is necessary except (1) in the case of patients who are desperately ill; (2) in children in whom suction or syphon drainage is desirable. A general anaesthetic is desirable, either gas and oxygen or ether being preferable. The chest should be opened as low as possible, usually between the mid-axillary and scapular lines by removing the eighth or ninth rib. The vertical skin incision is best. A wide short tube is used, this should not touch the diaphragm or lung. The tube should not be left in for more than four or five days and may be removed when the discharge becomes thin and serous. Lung expansion is encouraged from the beginning by blowing exercises like blowing up air cushions. Exploratory puncture with examination of the fluid to determine the organism present is an essential preliminary step and in many cases it is justifiable to wait for 24 hours to allow of a cultural diagnosis before operation.

Early Subacute Cholecystites.

By Dr. WILLIAM BAIN.

Practitioner, November, 1924.

THE disease may occur in the absence of gall-stones and often yields to treatment. It is five times more common in women than in men and usually in women who have borne children. It is suggested that gall-stones may often be formed in the absence of sepsis, and that the sepsis which occurs in many of the cases is secondary to the formation of the gall-stones.

The symptoms are often those of epigastric discomfort and flatulent indigestion. The characteristic sign is tenderness on deep pressure in the gall-bladder region, this is elicited by making the patient bend forward and breathe deeply. Sometimes duodenal ulcer is difficult to distinguish, but gastric analysis may help. In ulcer there is usually hyperchlorhydria, in cholecystitis hypochlorhydria. X-ray examination with a bismuth meal often helps. In treatment it is important to seek for a septic focus and attend to it if present; the teeth and tonsils should be carefully examined. A simple diet from which eggs, animal fats and pastry are excluded is adopted.

The bowels must be kept active by an aperient like aloes or phenolphthalein before dinner and a morning saline. Urotropin is often of value. Moderate exercise is desirable. Early cases usually do well and in most cases operation is not needed.

Cataract, the Expression Operation.

British Medical Journal, October '11, 1924, p. 662.

At a meeting of the British Medical Association Lieut.-Colonel Henry Smith, I.M.S., in the discussion on intracapsular extraction of cataract drew attention briefly to certain issues on the importance of which enough stress was not laid.

Control of the Eyelids.—Thorough control of the orbicularis, whether by novocain or by mechanical means, or by both when novocain failed, as it not infrequently did, was absolutely essential if the operator was to have a fair chance.

The Incision.—For an intracapsular operation the incision should be of 180 degrees, commencing in or just behind the sclero-cornea. If accidents turned it into a capsulotomy operation no harm was done: one never regretted having room enough, but always regretted having too little. Bursting of the capsule in expression was almost always due to too small a wound, and was generally due to the same cause in the traction form of extraction.

The Stancaleanu, Kalt, Knapp, and Sinclair methods were substantially the same. They would, he considered, be all improved if the operator made traction with one hand and pressed a squint hook on the flat—the point directed upwards—on the lower third of the cornea to assist in dislocating the lens. Dr. Barraquer's method would, he thought, be improved by using the squint hook in the same way. This would also render the capsule less liable to tear in all these cases. Dr. Barraquer still laid stress on not tearing the suspensory ligament some distance from the lens: to do so would undoubtedly imply more force than was justifiable. Having repeatedly examined lenses for this very thing with a magnifying lens before Dr. Barraquer commenced intracapsular extraction, he had never once found tags of suspensory ligament attached to the lens. He did not think that the zonule was ever thus torn, whatever method was adopted. The detachment was always directly from the lens, so that they need have no fear on this issue; vibratory movement had nothing whatever to do with it. There seemed to be a general demand for a less complicated instrument than Dr. Barraquer's, and Messrs. Down Brothers were likely to supply it in the near future.

The Physical Condition of the Lens.—Too much stress was laid on this issue. From the practical point of view

it was either a hard cataract or a Morgagnian cataract; if the former the plane of the iris was pushed forward, if Morgagnian it was the most ideal for the capsulotomy operation, or for the procedure which he had long advocated—the least favourable for any of the other methods of intracapsular extraction. The idea that the younger man must investigate every cataract and draw inferences bearing on operation by the newest methods of examining the lens rather tended to frighten him unnecessarily. The younger men in later years would surely come to agree with him that they were taught a thousand-and-one terrors, which proved to be bogies designed apparently to make sure that they would never draw blood and never acquire enough confidence to operate.

Escape of Vitreous.—People talked as though escape were not incidental to the old operation. Professor Parker of Detroit read a paper at the annual meeting of the American Medical Association in 1921, giving about 14 per cent. in his experience of about 1,400. It was much more serious in the old operation on account of the lens matter and capsule left behind than in the intracapsular operation. A large escape was as fatal as a choroidal hemorrhage: a small escape was of no consequence. Nature was unable to repair the large one, but was able to repair the small one; this was the only explanation why eyes with a small escape wore as well as those with no escape.

People seemed to swallow the conclusion that pressure and friction must do harm; therefore it did do harm; they drew a conclusion from one premise instead of two, and advanced no facts. The epithelial surface of the cornea would stand a surprising amount of friction without showing signs of reaction, and considerable pressure and pressure-strain was well tolerated and need not be feared, always provided reasonable skill was used. He had frequently extracted in the capsule down to 30 years of age, and a few times down to 25 without any sinister result. No one operating on patients over 50 years of age would have to use half this amount of pressure-strain.

Reference had been made to Dr. Barraquer's cases in America. Lieut.-Colonel Smith had had a similar experience. There was no finer body of sportsmen in the world than American surgeons, but in every country there were a few who "shoot the pigeon sitting." Dr. Barraquer operated on some cases and never saw them again; some of them were talked over or reported on adversely, the venom losing nothing as it passed round. The speaker was similarly treated at Chicago, but on independent inquiry it was found that the results were twice as good as reported; 6/50 turning out to be 6/6, and so on.

They were told that the old operation was satisfactory; why then this search for a better one? Their answer was: Take the immature cataract as one of the many cases in which it was not satisfactory. In this and every country they were very numerous; men in the prime of life—50 to 60—found themselves put on the shelf, so to speak, for five years, ten years, or even for life, until their cataracts were ready for the old operation. The penalty of waiting was tremendous; the demand was insistent, and they must give such patients relief. The old operation could not do it, but the new one could. India with its 40,000 cataracts a year, mostly intracapsular, would determine this question.

The Horizontal Position as a Cause of Puerperal Sepsis.

In the *British Medical Journal* of September 27th 1924, p. 557, Dr. Henry Corby of Cork makes the interesting suggestion that prolonged rest in the horizontal position after labour results in the lodgement of lochia in the uterus and vagina and so promotes sepsis.

He finds that the poor women who are treated as extern patients are much less liable to sepsis than hospital patients, and he attributes their freedom from sepsis to their habit of getting up within three to five days after labour.

He brings forward other evidence which points in the same direction and argues that the free discharge of the lochia is Nature's method of getting rid of debris and other pabulum for septic organisms. He now advocates early sitting up in bed at stated intervals soon after the completion of labour and he believes that the results are good.

Pruritus Ani.

DR. LOUIS SAVATARD of Manchester writes a special article in the *Lancet* of November 1st, 1924 on the treatment of pruritus ani.

He regards local causes as being even more important than general, and he instances catarrh of the rectum, threadworms, piles, polypi, fistulae, fissures, warts, etc., each of which conditions calls for appropriate treatment. Want of cleanliness after defaecation is also important and the use of moist pledgets of cotton wool followed by a dusting powder is recommended.

A thorough examination of the parts is essential before treatment is started.

After cure of the local lesions the itching may persist, in these cases various local remedies may be of value.

Such are:—

- (1) Carbolic lotion, 1 in 80.
- (2) Carbolic oil, 1 in 20.
- (3) Hydrarg. Ammon. grs. xv. ad. oz. i. of benzoated lard.
- (4) Calomel powder rubbed on the part after cleaning and drying.
- (5) For cases with thickening of the skin salicylic acid 6 per cent. in 50 per cent. alcohol, used as a paint.
- (6) X-rays are of the utmost value if employed by an expert radio-therapist. Four unfiltered doses of half pastille each at fortnightly intervals and then two further exposures after a month's rest are advised.
- (7) Zinc ionization is recommended by McLeod.
- (8) Vaccines of *Streptococcus faecalis* as used by Dr. Murray of Syracuse are worth trial in obstinate cases.

Uncalled for Appendicectomy.

DR. BETTMANN of Chicago deals with this important subject in the *Journal of the American Medical Association* of October 18th, 1924.

O'Neil of Massachusetts reports that 25 per cent. of the patients who had urethral calculi had previously been operated on for supposed appendicitis.

"Chronic appendicitis" is still the opprobrium of surgery, a large proportion of patients operated on for supposed appendicular trouble are not relieved.

Sonnenburg states that after 40 very few people have a normal appendix, yet many of these have never suffered from appendicular trouble, hence the removal of a diseased appendix does not necessarily mean the removal of the cause of abdominal disease.

It is not easy to determine whether symptoms are really due to the appendix in chronic cases, though true relapsing appendicitis is easy of diagnosis. Definite acute attacks occur in such cases and operation is nearly always followed by relief. Relapsing appendicitis should therefore be distinguished from "chronic appendicitis." In the latter condition not more than 60 per cent. of the clinical diagnoses are justified.

Stanton insists that in true cases there are almost always attacks of dyspepsia with epigastric pain radiating to the neighbourhood of the umbilicus or to the lower abdomen.

Nausea or vomiting associated with the pain occurs in nearly every case. Mere pain in the right lower quadrant apart from nausea is seldom relieved by appendicectomy.

Bettmann analyses 170 cases of failure to relieve by appendicectomy and finds that:—

66 were due to inadequate study of the case.

20 were due to the existence of peptic ulcers.

16 were due to the disease of the gall-bladder.

10 were due to misleading x-ray reports.

9 were due to genito-urinary cases.

12 were due to cases of colitis.

9 were due to pulmonary tuberculosis.

20 were due to miscellaneous causes like gastritis, hernia, ovarian disturbances, etc.

Mere pain and tenderness over McBurney's point is not enough to justify the diagnosis of chronic appendicitis. Prolonged observation of doubtful cases is essential, as an exploratory operation is by no means always a harmless procedure and a considerable number of persons have been damaged for life by such operations.

The Electrical Stethoscope.

DR. GAMBLE of Philadelphia has written an interesting account of this instrument in the *Journal of the American Medical Association* of October 18th, 1924. It is possible to convey heart sounds in a satisfactory manner to large audiences, as was demonstrated at the last annual meeting of the American Medical Association when cardiac sounds, râles, and even foetal heart sounds were heard by 528 medical men seated in one hall.

With recent modifications even better results have been obtained, and the sounds can be recorded on a phonograph record so that they can be reproduced when desired. By the use of electric filters certain sounds can be selected and others damped out so that certain murmurs can be detected which cannot be heard by ordinary methods. We are evidently on the eve of a revolution in the methods of teaching the recognition of abnormal sounds produced in the chest and other parts of the body.

The "Journal of Ayurveda."

WE welcome the appearance of a journal whose objects are "to bridge over the gulf that seems to be between Ayurveda and Western Medicine" and "to open up to the inquisitive world the treasures of the science and art of Ayurveda for the advancement of science and the relief of suffering humanity."

Ayurvedic medicine has been so much in the public eye of late that everybody is anxious to know more about it, and we trust that our ignorance will be dissipated by the *Journal of Ayurveda*. The editor has done us the honour to quote extensively from a recent editorial in the *Gazette* (Fashions in Medicine), and it is evident that he has taken seriously to heart an article which was written in lighter vein and was intended to be read in the same manner. In a recent number of the *Journal* we regret to notice that the writer of "News and Notes" has descended to the use of objectionable personalities.

These are not likely to benefit the cause of Ayurveda nor to hasten the day when all of us will practice really scientific medicine.

The aims and objects of the *Journal of Ayurveda* are the same as ours, although we are travelling on different roads, our sincere desire is that we may come together without undue delay, and when we do meet, may we both be found to be honest seekers for the truth.

Reviews.

LORD LISTER.—By Sir Rickman John Godlee, Bt., K.C.V.O., M.S., F.R.C.S. 3rd edition, 1924. Oxford: The Clarendon Press. Pp. 686. Illustrations 34. Price 21s. net.

THE medical man who wishes to gain a clear idea of the broad foundations upon which modern medicine and surgery are based should read two great books which are almost twin classics; René Valléry Radot's "Life of Pasteur" (English translation by Mrs. Devonshire), and Sir Rickman Godlee's "Lord Lister," the re-appearance of which in a third edition we cordially welcome. Both are finely written studies of immortal subjects, and deal with that splendid period of medical history when the work of the great pioneers was clearing the ground of the jungle of empiricism and tradition, and erecting the pillars of rationalism and experimental enquiry of the present-day "temple of medicine."

Head and shoulders above them all in Great Britain rose the figure of the greatest and noblest of British surgeons, Joseph Lister (1827-1912). Something of his nobility of spirit and glamour of personality may be gathered from a quotation from his graduation address to students in 1876; "If we had nothing but pecuniary rewards and worldly honours to look to, our profession would not be one to be desired. But in its practice you will find it to be attended with peculiar privileges; second to none in intense interest and pure pleasures. It is our proud office to tend the fleshly tabernacle of the immortal spirit, and our path, if rightly followed, will be guided by unfettered truth and love unfeigned. In the pursuit of this noble and holy calling I wish you all God-speed."

In these pages Sir Rickman Godlee writes in an eminently readable and charming style of that wonderful career of 85 years, whilst the finely executed portraits with which the volume abounds give an added interest to the volume. Lister was the son of a very remarkable man, Joseph Jackson Lister, a Quaker, a vintner, a Fellow of the Royal Society, and one who did much to bring microscopes and optical apparatus to their present day condition of perfection. Wisely, Sir Rickman Godlee allows Lister to tell much of his own story in abstracts from his long letters to the father to whom he was so devoted. It was customary in Lister's day for predatory Scotch surgeons to qualify in the North and then to seek livelihood and fame in the more genial and more wealthy atmosphere of the Southern kingdom. Lister reversed this procedure; he qualified from University College Hospital, took the F.R.C.S. (England) in 1852, and went to Edinburgh. Here he became house surgeon to that remarkable surgeon and wonderful teacher, James Syme, who welcomed such a recruit with open arms. Syme's consulting rooms were in the city, but he had a charming house at Millbank, once a pleasant suburb of Edinburgh, but to-day swamped in the midst of its slums,—a house which was the meeting place of a distinguished band of Edinburgh surgeons and intellectuals and foreign and learned distinguished visitors. From the very commencement Syme's influence and his system of clinical teaching exercised the greatest influence upon the career of Lister. Lister was exceedingly well qualified, as far as London standards then went; in Edinburgh, however, he found established a school of surgery which was far in advance of London standards, and in Sir Rickman Godlee's pages we have here presented an interesting account of that celebrated Edinburgh school; also indeed of the very acrimonious controversies which abounded between the chief protagonists of the day, "Edinburgh, Syme, 'super-house-surgeon,'" wrote Sir George Buchanan, his fellow student, from Univer-

sity College Hospital to Lister in 1853, "Why, you must be in a perpetual state of bliss of the most aggravated description, operations being to you a foretaste of the joys prepared for the good. We saw your name in the papers as an adopted child of Syme's, reporting a case for him." It was a not inaccurate description of the relationship between the two.

Having married Syme's daughter, Agnes, and after a continental tour, Lister settled in Rutland Street in Edinburgh in 1856, and at once devoted himself to the remarkable series of studies on the pathology of inflammation which preceded those of Metchnikoff, chiefly dealing with the vascular changes associated with this process. In the same year, he commenced to lecture to students, his first class consisting of 23 pupils. His lectures were entirely different in two ways from those of his contemporaries; he taught far more pathology than surgery, and in place of academic lectures, had patients brought into the lecture theatre one by one as was also Syme's custom. "He impressed us all deeply from the beginning...he worked us very hard...he taught us pathology more than surgery. The general impression was that he was a great thinker, and he was treated as such by all the men," wrote Sir John Batty Tuke, one of Lister's pupils, in later years.

The experiments on inflammation were succeeded by a study of the conditions of blood coagulation and of "spontaneous gangrene." By this time he was known as a young surgeon of great promise, and a keen pupil of Syme's and in 1860 the chair of surgery at Glasgow University was offered to him and he accepted it, to be followed in 1861 by appointment as surgeon to the Royal Infirmary. Here he contributed articles on amputations and anaesthetics to Holme's *System of Surgery*, and contributed many technical papers on new technique and instruments to the medical journals. All the time, however, his chief interest was in his laboratory and to him surgery rested upon the wide basis of pathological study.

The conditions of surgery in that day, however, are now almost inconceivable. "Any attempt to realise what teachers taught and students learned, and, in fact, what all doctors thought about hospital diseases in 1865, is like trying to appreciate the state of mind of the inhabitants of this planet before they had begun to doubt that it was the centre of the universe," writes Sir Rickman Godlee. "Hospitalism was rampant... and the surgical wards were dominated by erysipelas, septicæmia, and gangrene. When a surgeon operated in those days, what he hoped to obtain was an open wound streaming with 'laudable pus'." The mortality rates after amputation of limbs were 43 per cent. at Edinburgh Infirmary, 39 per cent. at Glasgow Infirmary, and some 75 to 90 per cent. in military practice; Syme indeed had given it as his reasoned conclusion that in all compound fractures of the lower limb, immediate amputation ought to be resorted to, and no attempt be made to save the limb. The mortality among women in child-birth from puerperal sepsis was something like 1 in 7, and every lying-in hospital in the land was a horrible focus of dirt and death. In many hospitals surgical or maternity wards had had to be closed on account of sepsis. Surgeons operated in filthy frock coats encrusted with an accumulation of years of blood, pus and dirt; their assistants attempted to secure equally filthy coats, whilst the ligatures for operation were carried, as badges of honour, in the buttonhole of the lapel of the coat. Sepsis reigned supreme; "I have come to the conclusion," wrote Cadge of Norwich, a well known surgeon, "that pyæmia, if it does not find its birth-place, does find its natural home and resting-place in hospitals; if and although a hospital may not be the mother of pyæmia, it is its nurse." Erichsen, a distinguished surgeon of the day, had just written a book in which he claimed that surgery had reached finality; it was too dangerous to open the abdominal or other body cavity, and all that remained in the way of future progress was to improve the technique of the

then-existent operations upon the limbs. Leibig, the German chemist, taught that suppuration in a wound was due to the access to it of the oxygen of the air; this could not possibly be excluded, and hence matters could not be improved. All sorts of measures were tried; giving a greatly increased space to the beds in the surgical wards, immersing operated-upon limbs in continuous water baths, testing different drugs and remedies in solution in dressings; nothing succeeded. Conditions were such as to appal Lister and every other thinking surgeon of the day. Lister was busy with a study of the exact position of the abdominal aorta and the details of excision of the wrist, but his thoughts were continuously upon the subject of inflammation and suppuration, his laboratory hours continuously spent upon devices to combat sepsis.

Meantime, however, upon the continent matters moved—as if in accordance almost with some great fore-ordained plan—to their appointed end. Semmelweis in Vienna made the remarkable observation that, in a large lying-in hospital, the chief mortality from puerperal fever occurred when the attendant physicians went from the post-mortem room to the lying-in wards, and that septicaemia and puerperal fever were identical diseases; also that the mortality was lower in the wards where the attendants were all females, who did not attend the post-mortem room, and highest in the wards where students attended who had visited the post-mortem room. He was ridiculed, persecuted, and deprived of his appointment; he died in a lunatic asylum; but to-day his memory is honoured throughout Europe.

In France, Louis Pasteur had been steadily at work. The fermentation of beers, taught Leibig, is due to the presence within them of *dead* yeasts; the yeasts, upon dying, liberate a catalytic agent which causes the fermentation. Fermentation, upon the other hand, taught Pasteur, is not due to *dead* yeasts at all, but to living and multiplying yeasts, which require sugar for their nutrition, and in the course of their metabolism produce alcohol from it. It was the first echo of a controversy which convulsed Europe for years; in France the battle being between Pasteur and Pouchet, in England between Tyndall and Bastian. Life, taught Pasteur, comes only from pre-existing life; "*le germe c'est la vie, et la vie c'est le germe.*" Sepsis in wounds, he claimed, is due to germs from the air or from the dirty hands of the surgeon or his assistants being introduced into them; and he proceeded to further matters by his discoveries of the staphylococcus and the streptococcus.

At that time "antiseptics" were already recognised, but the word then meant something far different from what we mean by it to-day; in those days an "antiseptic" was some drug or other which might help to reduce already pre-existing sepsis; to-day we use it for a drug which will prevent sepsis from occurring. Lister had for some years been carefully feeling his way to the introduction of antiseptics in surgical practice, but Pasteur's published views at once gave him the necessary clue. If Pasteur was right, if suppuration was due to germs from outside being introduced into an otherwise surgically clean wound, matters were simplified. Some substance must be used which would kill all such germs and prevent their access to the wound made during and after the operation.

The antiseptic principle introduced by Lister was something quite new. It was *not* the attempt to overcome sepsis which had already been established, as some of his contemporaries misrepresented the case; nor did it consist in the introduction of carbolic acid lotions in surgical practice. It was a new method, a new visualisation, a new procedure, based upon experimental pathology. Several surgeons prior to Lister had used carbolic acid, Lemaire had investigated its value as an "antiseptic," and it was in use,—in the crude form of that day,—as a deodorant for the treatment of the sewage of Carlisle. Lister introduced it into his surgical practice and experimented upon it in his laboratory. At first he used the crude acid, swabbing the

wound out with it after operation, and covering it with a small dressing of lint soaked in the crude acid and covered with a sheet of tin or lead foil in order to keep the volatile acid in contact with the wound. The result was to produce a sterile seah, under which the wound healed aseptically.

He soon realised, however, that the crude undiluted acid was unsuitable, and commenced to use lotions of 1 in 20 and 1 in 40 strength; strengths which we to-day recognise as still irritant to the tissues. In 1867 he published the first of his famous papers upon the antiseptic principle, giving the wonderful results obtained in his first series of 11 cases of compound fracture treated with carbolic acid. Also he now introduced a second principle into surgery; previously it had been customary to leave the ends of ligatures long, so that they hung out of the angle of the wound, and were removed as they sloughed off. Confident in his antiseptic technique, Lister began to cut the ligatures short and to leave them buried *in situ*. It was a second new principle in surgery, of importance only secondary to the introduction of the antiseptic principle.

Subsequent to the introduction of the antiseptic principle, the evolution of modern surgery was both rapid and brilliant. Lister introduced the carbolic spray,—at first in the form of the hand spray, later of the mechanically worked "donkey engine," still later the steam spray. Under these sprays the atmosphere around the operation wound was saturated with the vapour from a 1 in 20 solution of carbolic acid in the hope of killing germs which might have access to the wound. Also he was continuously at work trying to improve the dressings of the wound, the principle being to apply a first dressing which should contain carbolic acid, then to cover this with a "protective" impermeable dressing such as oiled silk which should prevent loss of the antiseptic by volatilisation; and the cerate dressing, the putty dressing, carbolic gauze, and finally the double cyanide gauze which is to-day in such frequent use, followed.

Lister's struggle, however, to establish the new principle was a long and bitter one. Gradually there grew up a younger generation of surgeons, many of them his own pupils, who spread abroad and who themselves practised the new doctrine. Thus at Edinburgh progress was rapid, whilst several of the staff at Glasgow became converts to his ideas. In Germany especially was antiseptic surgery taken up with enthusiasm. In France, however, progress was far slower, and the sufferings of the French wounded during the Franco-Prussian war of 1870 under the old régime of sepsis and filth were indescribable. In London "listerism" was generally sneered at. Many of the older surgeons, especially Sir James Simpson, Lawson Tait in Birmingham, Nunneley, and Savory, attacked Lister. His ideas and views were entirely misrepresented; he was accused of trying to lay claim to be the first surgeon to use carbolic acid, his methods were "tested" in a half-hearted method with bad results; that what Lister had done was to introduce a new idea and a new principle was grasped by none of his critics; to-day the echoes of that fierce controversy sound almost incredible. For example, Lawson Tait sneered at antiseptic surgery to the day of his death; yet in his own practice Tait used a technique which was an approximation to the aseptic method, repeatedly washing his hands and pouring gallons of warm boiled water into the peritoneal cavity with which to flush it. Yet, despite a fierce and almost unanimous opposition from the older school, antiseptic surgery gradually became more and more universally practised on account of its excellent results.

Lister had created antiseptic surgery; his use of the short ligature had revolutionised surgical practice; yet a third great problem faced him; that of the best method of arresting hæmorrhage in aseptic wounds. From 1867 he was continuously at work investigating the best methods of preparing and sterilising catgut, work which led to the modern chronicised ligature.

The introduction of an absorbable ligature, in place of the old-fashioned thread one, again almost revolutionised surgical practice. Again he was misrepresented; what he claimed was that the catgut was invaded and subsequently replaced by fibrous tissue; what his opponents said he claimed was that the catgut was absorbed by the body fluids. In chapters 16 to 22, Sir Rickman Godlee gives a vivid and very interesting account of the fierce controversies out of which the antiseptic method arose, to be finally almost reintroduced into England from Germany in improved form.

In 1869 he was appointed professor of clinical surgery in Edinburgh; in 1869 his father died, and in 1870 his great friend Syme. By degrees the work in his laboratory became more and more bacteriological, experiments to confirm Pasteur's views on the germ theory, and a study of lactic acid fermentation. This brought him into correspondence with the great French genius; and led to a medical *entente cordiale*, which it is pleasant and refreshing to look back upon in these later days when the two great nations have stood shoulder to shoulder through war and suffering, and have learned to appreciate each other better. One of the chief exponents of the germ theory in Great Britain was the great physicist Tyndall, whose optical studies upon the dust of the atmosphere and whose popular lectures to lay audiences did much to familiarise the populace at large with the germ theory.

A still further improvement in surgical technique introduced by Lister in 1871 was the introduction of rubber drainage tubes. Previously, when ligatures had been left long and hanging out of the angle of the wound, it was thought that these might improve drainage. Actually they became blocked with clot and provided no drainage at all. The story has often been told of how Lister, when operating for axillary abscess upon Queen Victoria herself, during a stay at Balmoral, took a bit of rubber tubing from the spray apparatus used to produce local anaesthesia, and used it as a drainage tube.

Whilst it was chiefly in the provinces in Great Britain that the antiseptic system spread, in Germany it took deep root. Volkmann was a doughty champion; Stromeyer playfully summarised the situation in the following lines to Lister:—

"Mankind looks grateful now on thee
For what thou didst in surgery.
And Death must often go amiss,
By smelling antiseptic bliss."

The Munich hospital was notorious for its terrible condition of "hospitalism," hospital gangrene occurring in no less than 80 per cent. of all wounds, whether of natural origin or inflicted by the surgeon. The introduction of Lister's methods abolished sepsis from the institution. Von Bergman at Würzburg, and von Volkmann, and Billroth of Vienna became enthusiastic disciples of "listerism"; whilst Saxtorph in Copenhagen was one of the first to introduce antiseptic surgery on the continent of Europe. By degrees, with confirmation of its value on the continent, and in America chiefly in the hands of R. F. Weir, the principles of antiseptic surgery became internationalised and established. In 1875 the annual meeting of the British Medical Association was held in Edinburgh, an event which did much to establish "listerism" as the guiding principle of British surgery.

In the same year came the now famous correspondence with Queen Victoria regarding the value of vivisection in experimental medicine; a controversy in which, despite his position as Surgeon in Scotland to Her Majesty, Lister did not flinch from expressing his emphatic views that such experimentation was not only essential but even necessary for the study of diseases, even those of animals themselves. The student of to-day will find in these pages of Sir Rickman Godlee's book valuable and emphatic expression by Lister himself of what he owed to experiments upon animals in the development of modern surgery and medicine. In

1876 he gave the graduation address at Edinburgh, emphasising in a very remarkable address to students the high standards and privileges of the medical profession; and in 1877 he moved to London, on appointment to the chair in clinical surgery at King's College Hospital.

In London, Lister found an almost hostile atmosphere; London indeed was far behind both Scotland and the continent in its acceptance of his views. Also his unpunctuality at appointments and his curious preference for leaving the amount of the fee to his patient to decide were against him in private practice. Yet he opened his campaign with a minimal number of both students and beds, and he taught bacteriology and pathological fundamentals, rather than operative surgery. Addresses to the Pathological Society and to the Harveian Society followed. In 1877 he wired a broken knee-cap by open operation,—a novel procedure. "Now when this poor fellow dies," remarked one of his colleagues, "it is proper that someone should proceed against Lister for malpraxis." But the patient did not die, healing took place by what Lister now termed "the usual aseptic course"; the expected catastrophe was averted.

In 1881 there was held the ever-memorable Seventh International Medical Congress in London; when Volkmann in a brilliant address hailed Lister and the glory of England as being indissolubly bound with the greatest advance that surgery had ever made. Pasteur also paid his tribute to the great surgeon, and by now it could be claimed that "listerism" had triumphed; its opponents were in the background; whilst Lister himself in his final address upon the method and principle summarised his views and the struggle of the past years.

There followed the—supposed—controversy between antiseptic surgery, where by the use of strong antiseptics the attempt is made to kill all germs which may have access to a wound, and aseptic surgery, the attempt to prevent by heat and other physical means the access of any germs at all to the wound. As Sir Rickman Godlee rightly claims, such a controversy is to-day of but barren interest; the one method is but the logical development of the other. In actual fact, indeed, the asepticists use very strong antiseptics, iodine with which to sterilise the skin, bioniodide lotion for the operator's hands, and so forth. He proclaims himself frankly as a follower of the antiseptic rather than the aseptic school. And here—in chapter 27—is much valuable writing of special interest to the reader in India. We cannot but consider that Sir Rickman Godlee is right. The aseptic method is only suitable in large and well equipped institutions. The long chain of subordinates upon which the success of the aseptic method depends is a very vulnerable one. Dressings are sent out in sealed and sterilised packages by manufacturers; catgut comes from Heaven alone knows where; there is an army of theatre sisters, nurses, assistants and subordinates, every one of whom must practise an absolutely aseptic technique if sepsis is to be avoided. In actual practice he doubts whether the aseptic technique gives better results than does the antiseptic one. (For our own part, and as regards the small *mofussil* hospitals in India, with few or no skilled assistants and a minimum of equipment, we have no doubts; antiseptics may be irritating to the tissues, but the full aseptic technique is a counsel of perfection and impossible of attainment.)

Space does not permit our following further Sir Rickman Godlee's fascinating story of this greatest of British surgeons. His baronetcy was conferred upon him in 1883; an honour which was especially noteworthy among the very small number of medical baronets who had been created at that day. In London in general his life was easier and with more leisure in it than in Edinburgh; his hours more given to his laboratory and to his "common-place books", (notebooks and records). In 1887, together with Sir Victor Horsley and many of

the leading medical men of the country, he was appointed a member of the Commission sent to Paris to study Pasteur's anti-rabic methods; a Commission which resulted in the Muzzling Order and the extirpation of rabies from Great Britain; in 1893 the celebrated Lister Institute at Chelsea was opened, in the teeth of opposition from antivivisectionists and of lethargy on the part of government officials, and by public subscription; to be subsequently set upon a sound financial basis by Lord Iveagh's noble endowment of £250,000 in 1900. In 1887 came the historic scene at the Pasteur jubilee at the Sorbonne in Paris, when Pasteur and Lister,—the latter representing the Royal Society of London and that of Edinburgh—were the two honoured guests, a celebration immortalised in the etching by Rixens; whilst in 1895 he became President of the Royal Society, a position only once previously held by a surgeon (Sir Benjamin Brodie, 1858–61).

In 1893 Lady Lister died, his intimate companion, secretary and fellow-worker for 37 years. From that time onwards Lister lived a solitary, secluded and saddened life. The laboratory work, the addresses to learned and scientific societies, and his keen and critical experimental work continued, but he withdrew more and more from social and public life. Honours descended upon him and his 80th birthday in 1907 was celebrated all over the world. In 1912 he died, and—in spite of his personal wishes was buried in Westminster Abbey, where Sir Thomas Broek's medallion of him is for ever memorable. The anthem at the funeral service was singularly appropriate:—

"When the ear heard him, then it blessed him; and when the eye saw him, it gave witness of him; he delivered the poor that cried, the fatherless, and him that had none to help. Kindness, meekness, and comfort were in his tongue. If there was any virtue, and if there was any praise, he thought on these things. His body is buried in peace, but his name liveth for evermore."

Sir Rickman Godlee's fine and scholarly book is a memorable tribute to an immortal subject. We cannot live again those glorious days of the great past; but in its pages we can catch again somewhat of their glamour, of their nobility, and of the great and heroic figure who created and rendered possible modern surgery,—a knight of modern days, "sans peur et sans reproche."

R. K.

THE DIAGNOSIS AND TREATMENT OF THE INFECTIOUS DISEASES.—By F. H. Thomson, M.B., C.M. (Aberd.), D.P.H. H. K. Lewis & Co., London, 1924. Pp. VIII + 208. Price 7s. 6d. net.

This is a thoroughly practical little book which is based on 34 years experience of infectious diseases in connection with the Metropolitan Asylums Board of London.

The author has had an extensive knowledge of the difficulties which are encountered by the general practitioner and his chief aim has been to deal with those doubtful points which are commonly slurred over in the text books.

There is a good article on lethargic encephalitis which will be widely appreciated. Treatment is very fully dealt with and altogether the book is sure to appeal to a large number of medical men.

PHYSICAL DIAGNOSIS.—By W. D. Rose, M.D. Fourth Edition. St. Louis: C. V. Mosby Co., 1924. Price \$8.50. Pp. 755.

This book is well written, well printed and well illustrated. It has already had a great measure of success, which is probably due in great part to the attractive manner in which the methods of diagnosis are set forth. There are no less than 319 illustrations

in the 755 pages of the book and each of these teaches a lesson.

From the point of view of the Indian student and the Indian medical man it is a drawback that only physical diagnosis is dealt with. Books which deal also with laboratory methods are more in request in a country where the weight and cost of text books are matters of great importance. The medical man who wishes to bring up to date his knowledge of physical diagnosis will find this book just what he requires.

Annual Reports.

ANNUAL REPORT OF THE EXECUTIVE HEALTH OFFICER OF THE CITY OF BOMBAY FOR THE YEAR 1923. BOMBAY: THE TIMES PRESS, 1924.

This is an ably written and very interesting report. Bombay city covers an area of $2\frac{1}{2}$ square miles and has a population of 1,176,000. In 1923 the recorded birth rate was 17.32 per mille and the death rate 31. This birth rate is phenomenally low and is a usual feature of Bombay vital statistics. The reasons adduced are defective registration of births and the custom whereby married women leave Bombay for their confinements. About 33 per cent. of the infants in Bombay are born elsewhere. About 10 per cent. of the births are unrecorded. Allowance for these two factors raises the birth rate to 28,—still a low figure which points to an actual want of fertility in the women of the city. Most of the births occur towards the end of the year.

The death rate is high, but is about the level of the ante-plague years. It will hardly be credited that 66 per cent. of the population of Bombay live in one-roomed tenements. About 25 per cent. of the deaths are certified by medical practitioners, vaidas and hakims. As elsewhere in India, respiratory diseases top the list as causes of death; congenital diseases and diseases of infancy coming next. Infant mortality is considered in considerable detail. The ratio per thousand reported births was 411. This figure represents an exaggeration; making allowances for unregistered births in the city and for infants born outside the city, a figure of 269 is obtained. Making all allowances, however the health officer is of the opinion that the infantile death rate of Bombay must be one of the highest in the world. It is high amongst the better classes also and malaria is suggested as the cause. Infantile debility and respiratory diseases account for most of the deaths, 38.8 per cent. of the deaths occur in infants under one month. An excessive infant mortality in Bombay occurs with a high general death rate and fluctuations of the one correspond with fluctuations of the other. The fact noted above that 66 per cent. of the population live in one-roomed tenements explains to some extent the high infantile mortality, which varies inversely with the number of rooms per family.

An interesting description is given of the various measures taken for the preservation of infant life. A complete scheme of voluntary welfare centres, maternity homes, infant milk depôts and municipal nurses exists and should soon effect a considerable improvement.

Epidemic and other diseases.—About 25 per cent. of actual cases were notified by medical practitioners. **Plague.** From February to June this disease assumed epidemic proportions. Inoculation, rat destruction, evacuation and disinfection were the measures adopted. During the months of March, April and May from 5 to 7 per cent. of rats examined were plague-infected. Pesticine is the disinfectant used.

Cholera caused 323 attacks and 189 deaths. The disease was introduced by Mahomedan pilgrims, about 17,000 of whom passed through the city. Inoculation

was of distinct benefit as a preventive; water borne disease could not be definitely excluded and the drinking water supply was chlorinated. This was followed by a distinct fall in the mortality, but the fall was too sudden to be accounted for by the disinfection of the water.

Tuberculosis accounted for 1,371 deaths, of which 1,227 were due to phthisis. An anti-tuberculosis league exists, with 2 dispensaries for out-patients, and a sanatorium with 32 beds. Three nurses are attached to each dispensary for visiting work. There is inadequate provision of hospital accommodation for advanced cases of phthisis. A good start has, therefore, been made for dealing with this terrible problem but naturally housing and economic conditions are very bad enemies at the outset.

Malaria threatens to become a serious menace to the city population and especially to the crews of visiting steamers. Dr. Bentley's work on Bombay malaria is well known: he pointed out amongst other things the dangers of wells as breeding places of *A. stephensi*. Cisterns would now appear to be a serious danger, and also constructional work. *A. stephensi* is the most notable carrier here. The Back Bay reclamation scheme threatened to become a serious danger in regard to providing breeding places for *Anopheles* and a special sanitary committee has been appointed to look after this area. Several cases occurred where crews of ships after leaving Bombay developed serious malaria, and Lieut.-Colonel S. R. Christophers, I.M.S., was deputed to report on the causative conditions. In his report Colonel Christophers has sounded a note of warning which the authorities and the public will no doubt heed. Wells, uncovered cisterns, and new constructional work all provide suitable breeding places for *A. stephensi* and are a source of danger to the whole of the population, poor and well-off alike. The remedies suggested are covering in of wells and cisterns, the provision of an adequate constant water supply to do away with the necessity of cisterns, and legal powers to enforce constructional works being conducted in areas where other methods cannot control mosquito breeding.

As Colonel Christophers says, "Which is the most dangerous, a heap of rubbish or an uncovered cistern?" Undoubtedly the latter, but the former can be legally dealt with as a nuisance, the latter cannot. A great deal of attention is paid by the malaria department to the stoppage of mosquito breeding. The Back Bay Reclamation Scheme has a special medical officer to look after potential mosquito breeding. The yards of the large railway termini would seem to be danger spots. A summary of the work done during the year points to the energy of the department in anti-malarial measures.

The League for Combating Venereal Diseases is a voluntary agency, with a well equipped dispensary for free diagnosis and treatment. Post-graduate classes for medical practitioners are held three times a year. This is excellent work and will progress. The Corporation maintains twelve municipal dispensaries to administer free relief to the sick poor.

Milk Supply.—Those who know Bombay will remember the great numbers of milk cattle stables from which the milk supply of the city is drawn under conditions anything but sanitary or ideal. These are a menace and a nuisance to the public health and are to be removed to Trombay. In addition, the importation of milk from outlying places is to be encouraged. The amount of milk consumed in Bombay is 3.1 ounces per head. In London the average is 5 ounces and in New York, 11 ounces. The milk available, therefore, is far below the real needs of a vegetarian population. A very real effort is being made to solve the problem of milk supply and this will be watched with interest by other communities in India, especially in the large cities.

Water Supply.—This is insufficient in amount and intermittent in supply. All is unfiltered, but schemes are under consideration for the filtration of all the water, and the construction of the third pipe line from

Tansa Lake is proceeding rapidly and should afford relief.

Conservancy.—The old insanitary basket privies still abound and constitute a very big problem. The present sewer system is inadequate and the scheme for re-modelling and enlarging the whole system is still under consideration.

Housing.—An ambitious scheme for systematising routine inspection of every house is under way; many inspections have been done and a large number of defects remedied.

The City Improvement Trust is gradually demolishing insanitary areas, the inhabitants being transferred to new tenements. A scheme for the construction of 50,000 new tenements for the working classes is under way and if funds are available the whole of the slum areas will be tackled. Already, since 1898, no less than 25,427 new tenements have been provided against 25,955 demolished. The corporation is providing 8,000 tenements for its employees.

These schemes represent great aims and solid achievement. The infectious diseases' hospitals have carried out excellent work. The mortality in cholera cases is now 31.3 per cent. instead of 60 per cent. An outbreak of cerebro-spinal fever occurred but the attempt to determine the type failed as the suitable agglutinating sera were not available.

The food-stuffs examined in the municipal laboratory were mainly milk; of 4,267 samples examined 1,738 or 41.3 per cent. were found adulterated. The amount of chlorine necessary to disinfect the Tansa water was found to be 0.78 parts per million, so that lactose fermenters would be absent in 50 c.c. The time of contact is, however, not stated. The result of the routine bacteriological examination of the Bombay waters is disappointing and the schemes for filtration and disinfection would seem to be thoroughly justified.

The corporation and Dr. Sandilands and his staff are to be congratulated on the able report put forward of a year's hard work on lines at once enlightened and progressive.

A. D. S.

ANNUAL REPORT OF THE HEALTH OFFICER OF THE CITY OF MADRAS FOR THE YEAR 1923. MADRAS: KAPALEE PRESS. 1924.

THIS well-written report describes clearly the vital occurrences and the various activities of the health department of Madras city during 1923. The population of Madras city, which covers an area of 27½ square miles, was 526,911 at the census of 1921. The review of the vital statistics reveals a satisfactory condition during 1923; the birth rate was 43.6 per mille, the death rate 37.8; and the infantile death rate 254 per thousand registered births. The birth rate showed an increase, while the death rate and the infantile mortality rate showed a decrease on the average figures for the previous ten years. It is interesting to compare these figures with those of Bombay which for 1923 showed 17.32; 31; and 411 respectively. There was a notable absence of any epidemic disease. The system of registration has been revised and it is hoped that more correct returns will ensue. The number of still-births seems to be on the increase, the causes adduced being poverty, unhygienic home conditions, and parental disease. Interesting charts display the age and sex distribution of mortality, the greatest mortality being at the extremes of life. The importance of age and sex composition of a population in influencing the general mortality and the birth rate is pointed out. Comparisons of death rates alone of cities like Bombay and Calcutta and Madras as criteria of healthiness would be fallacious. For instance at the age-period 15 to 40, Madras has 1,000 men for every 940 women, while in Bombay and Calcutta the proportions are 1,000 to 360 and 1,000 to 420 respectively, a very great difference. Again at the period 20 to 45 when death rates are low, Madras

has 20 per cent. of such, while the proportion in Bombay and Calcutta is 40 per cent.

The question of infant mortality, its causes and the measures likely to be of use, are fully discussed, and the interesting description given of the child welfare schemes at present in operation reveals the energy and ambition behind this important work. As has been noted in other Indian cities the infantile mortality rate fluctuates or has done so in the past with general mortality rates. It is pointed out that the ordinary infantile mortality rate is composed of two distinct components,—the mortality up to one month after birth, and the mortality from the first to the twelfth month of life. It is the second component which seems to be particularly vulnerable; the first, even in advanced countries, has not been reduced materially; and it is against this component that the energies of ante-natal care and treatment of the mother are particularly directed.

Malaria does not seem to have been a potent cause of general mortality; and only 52 deaths from kala-azar were registered. Cholera occurs in August and December. A reduction in small-pox deaths is noticeable after the heavy toll this disease took of life in 1921. Only one case of plague occurred. Diarrhoea and dysentery occurred to the same extent as in 1921 and the water supply of Madras city would seem to require attention. Diseases due to the tubercle bacillus would appear to be increasing not only in the city but in the province. This is a serious problem in other Indian cities and is largely an economic one. Relapsing fever was present but only claimed two deaths out of sixty-two attacks, a tribute to the efficiency of those responsible for diagnosis and treatment and to those who undertook preventive measures. The number of deaths certified by medical men formed only 12.7 per cent. of the total deaths in the city and the greater proportion of these were certified from public hospitals. In spite of this the health department by its own inspectors maintains the accuracy by a very efficient method of inspection and control. As regards vaccination a disquieting feature is the growing tendency for medical practitioners to give certificates of postponement of vaccination on grounds of health. Trivial complaints are given as excuses for these certificates.

The quality of the drinking water has received attention. A mixture of filtered and unfiltered water is apparently given to the city and the result is naturally not satisfactory.

Anti-malarial measures, especially in regard to insanitary tanks, are hampered by legal restrictions which make practical action nearly impossible. The housing problem exists in Madras as elsewhere. Improvements such as are undertaken by Improvement Trusts are necessary. No Food Adulteration Act is in force yet; this would seem to be an urgent necessity in a city of this size.

The inspection of school premises and school children is being undertaken in a serious manner. Insanitary conditions have been pointed out and a system of postcards introduced by which the information regarding any medical defect, uncleanness, etc., of children, is sent to the parents, with suggestions for remedies; parents were invited to be present at the time of inspection. A striking fact emerging from the inspection is the prevalence of infectious diseases, including skin affections and tuberculosis. Malnutrition is common and the average weight and height is below English standards for the various ages. This is hardly a just comparison, of course.

It is said in Madras that "dental diseases are not so common a feature in this country as in England"; in our experience this is hardly true as a general statement for other parts of India.

The numerous hospitals and dispensaries in the city have achieved much good work throughout the year.

The municipal laboratory was established in 1922 and undertakes the chemical and bacteriological

examination of water and food-stuffs. The bacteriological quality of the drinking water in the city mains was not completely satisfactory. There is an interesting note on the growth of a species of polyzoon in the conduit mains. There would appear to be a very large amount of organic matter in the Madras water. The conservancy bullocks seemed to have suffered from a variety of diseases; trypanosomiasis and multiple abscesses, anthrax and tuberculosis, and foot-and-mouth disease were all prevalent. The fact that 8 bullocks died from tuberculosis is notable.

The report is interesting and deserved better treatment at the hands of the printers and compositors; the number of misprints are so numerous as to be irritating, the page of *addenda et corrigenda* could have been extended, and itself contains two glaring misprints.

A. D. S.

ANNUAL ADMINISTRATION REPORT OF THE ASANSOL MINES' BOARD OF HEALTH, FOR THE YEAR 1923-24. CALCUTTA: JAMES GLENDYNE, LTD., 1924.

THE Asansol Mines' Board of Health is an *ad hoc* authority created by the Government of Bengal by the Asansol Mining Settlement Act (Act II of 1912). The area has a population of nearly 330,000 and consists of mining areas, villages and municipalities. In such a congested area cholera and small-pox and other infectious diseases will tend to be rife, and the Board was created mainly for the prevention and control of these diseases. In Dr. Tomb the Board are fortunate in having an energetic and capable Chief Sanitary Officer, and the report gives ample justification for the creation of the Board, while the statistical figures bear eloquent evidence of the energetic activities of the sanitary staff. An appendix compares the vital statistics of the area with those of Calcutta and Howrah. The death rate during the period under review was 17.97 compared with 28.4 and 28.64 for Calcutta and Howrah. Its cholera incidence is half and its small-pox incidence about one-tenth of the rate of these towns.

The present act does not, however, confer wide enough powers, and it is hoped to have these extended by an act similar to the Bihar and Orissa Mining Settlement Act of 1920.

The Board keeps a careful watch on the villages bordering on its areas, and epidemics in these are promptly checked so that epidemic disease does not enter the area from these sources. The sanitary work covers a variety of objects, the chief perhaps being the suppression of epidemics, and particularly of cholera, the incidence of which compares very favourably with other places; Dr. Tomb places great faith in his essential oils mixture as a preventive and as a curative agent in the early stages of the disease before collapse has set in. It would be interesting to hear of results in other parts of India where it has been tried.

The incidence of small-pox was remarkably low, and 40 out of the 50 cases occurred in outlying villages. Vaccination was widely carried out from house to house free of charge. There was no case of plague or epidemic dropsy and the year was remarkably free from malaria. Respiratory diseases accounted for the greatest number of deaths; a critical analysis of these, if possible, would be interesting. The collection of complete vital statistics is as elsewhere a matter of concern; a reward of two annas to village *dais* for reporting authentic births was not a success.

The infantile mortality rate was 150, a figure that compares very favourably with other areas and towns. An interesting note is given on the work of the malarial investigation staff. *A. rossi* and *fuliginosus* formed the largest number of *Anopheles* species found, with a small percentage of *culicifacies*. An opinion

as to the local carrier would be very interesting. Medical inspection of school children and lectures to the public and to schools form other activities of the Board. The Board and its Sanitary Officer are to be congratulated on the excellent work accomplished. This is an excellent example of what can be done by concentrated continuous action and should act as a stimulus to other local bodies.

A. D. S.

Correspondence.

THE CAUSATION OF CANCER.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—I have read with much interest a long review of my book "Cancer: How it is Caused, How it can be Prevented," in your November issue. I am glad to see that you consider that the book will be practically useful. Indeed, I have received hundreds of letters from doctors and non-doctors spontaneously thanking me and telling me that adoption of my suggestions has been followed by vast benefit in health. While praising the various reforms urged in my book, you not unnaturally express doubt as to my analysis regarding the origin of cancer. Your scepticism is perfectly justified in view of the numerous loudly advertised cancer "cures" which have proved disappointing. I am sure that you and your readers will be glad to hear that I have received invaluable corroboration of my views since the publication of my book.

My thesis is that cancer is a disease of civilization, that it is practically unknown among primitive races leading primitive lives, and that it is due to chronic poisoning and vitamine starvation, to wrong living, that it is more frequent in the towns than in the country, more in evidence among the rich than among the poor.

My statement as to cancer being practically unknown in the wilds has lately received confirmation from a great many quarters. For instance, Lieut.-Colonel H. Hallilay, I.M.S., has informed me that he has been practising chiefly among the Himalayan hill-men for more than twenty years, that they do not suffer from cancer and its allied troubles such as gastric and duodenal ulcer, appendicitis, colitis, etc., that he has performed an enormous number of operations on these people, among them 700 for stone in the bladder, but that he has had not a single operation for an internal cancer, although a great many of the hill-men live to an advanced age. Other informants have sent me similar data. Cancer is a disease of civilization, and a few exceptions in the wilds merely confirm the rule.

The fact that arsenic, aniline and various other virulent poisons may lead to cancer after twenty years or more if absorbed continuously in infinitely small doses is shown by hundreds of examples in my book. Burn has an effect practically identical to poison, as I have shown by giving details of scientific experiments. A severe x-ray burn, like severe poisoning with aniline or arsenic, does not lead to cancer, but more or less continuous burning, though ever so slight, is apt to be followed by cancer, as a rule after ten years or more. Chronic poisoning by chronic burning is furthermore shown in the case of *kangri* cancer and of cancer of the oesophagus and stomach. We unfortunate civilised people drink our tea, etc., at 150°, while our bath is only 105° or 110° at most. Chronic poisoning from the bowel is one of the most frequent sources of cancer, but the outbreak need not be in the bowel itself. Cancer being a blood disease, the outbreak is likely to occur at some weakened spot, such as the breast or the uterus. In the overwhelming majority of cancer cases which I have investigated, the

cause can clearly be traced to chronic poisoning in some form or other, and vitamine starvation favours chronic poisoning inasmuch as it weakens the body in general, as it causes constipation and as it leads to lesions in the bowels through which the toxins are readily absorbed into the body. The fact of vitamine starvation bringing about these lesions has been brilliantly proved by the experiments of Colonel McCarrison.

The richer the people are, the more refined, the more concentrated, the more manipulated and the more denatured is the food they eat. The wealthy suffer most intensely from vitamine starvation, from constipation and auto-intoxication consequent upon it, and from protein poisoning. To-day a gentleman came to me and told me that his wife had died from cancer three months ago, that he had read my book, that in her case my analysis was wrong, that the lady was not constipated, that she had led a regular and normal life. Enquiry elicited that the victim had lived on the richest and most concentrated foods. She ate meat three times a day, never ate raw fruit and salads, and she took practically no exercise. Although she had an evacuation every morning her bowels were probably always filled with putrid flesh eaten several days ago.

In lunatic asylums, homes for the aged, convents, monasteries, etc., the cancer death rate is extremely low. I do not wish to encroach upon your space by proving that point in detail. But then the inmates of these public institutions are plainly and rather poorly fed. They eat large quantities of vegetables of their own production, very small quantities of fresh meat raised in the neighbourhood, and tea, porridge, etc., is never piping hot, to the dissatisfaction of newcomers. "Scientific" foods and chemically preserved food, foods which have been deprived of vitamins and mineral salts, are practically unknown in those institutions and adequate exercise promotes the expulsion of the cancer poisons by skin, bladder and bowel. Among the hard working agricultural labourers and coal miners who perspire profusely and who work in a stooping attitude which promotes peristalsis, the cancer death rate is extremely low in England, but among their wives, who potter about the house, it is very high.

It seems to me obvious that cancer is a disease of wrong living and that it can be eliminated by right living, and this view is being held more and more widely among experienced medical men who have read my book.—Yours, etc.,

J. ELLIS BARKER.

ALBION LODGE,
FORTIS GREEN, LONDON, E.2.

THE BERIBERI PROBLEM: A CORRECTION.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—With reference to the article by Major R. N. Chopra, I.M.S., and myself in your issue for last January, will you very kindly publish this letter in your next issue to correct the clerical error which was made in stating that "Fraser failed to produce beriberi in prisoners fed on polished rice." It is, of course, well known that Fraser and Stanton, 1909 (*Lancet*, Vol. I, February 13th), clearly showed that white rice was concerned in the production of beriberi.—Yours, etc.,

H. W. ACTON,
Major, I.M.S.,

CALCUTTA SCHOOL OF TROPICAL MEDICINE,
6th February, 1925.

INTRAMUSCULAR QUININE.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—In a recent publication—(*Indian Journal of Medical Research*, Vol. XII, No. 2, October 1924)—

two well known members of the staff of the Calcutta School of Tropical Medicine made the categorical statement that the intramuscular injection of the salts of the alkaloids derived from cinchona bark should be considered as malpraxis, and that the "only one method" of administering the cinchona alkaloids is by the mouth.

It is, however, admitted by them that "very rarely" in grave cases, e.g., cerebral malaria, when an immediate action is required, quinine base should be injected intravenously.

That the administration of quinine intramuscularly has been practised too extensively is admitted by many, and the exact work of Majors H. W. Acton and R. N. Chopra, I.M.S., should have a deterrent effect on those who, in the past, have systematically pumped these irritant and tissue-destroying substances into the depths of the muscles without pausing to picture mentally the local necrosis which inevitably results.

There are, however, a number of cases in which it is practically impossible to administer the necessary drugs either by the mouth or by the intravenous method, and in which it is of the utmost importance to use the intramuscular route.

In very young children it is often exceedingly difficult or impossible to find a suitable vein. Young children, unfortunately, are apt to be unable to retain quinine if given by mouth during the first few days of a malarial attack, particularly if there is frequent vomiting and general gastro-intestinal disturbance, as is not uncommonly the case. My experience has been that intramuscular injections of quinine bihydrochloride in such cases have resulted in very great benefit to the patients concerned.

In a small number of persons, particularly stout, middle aged females, it is quite impossible for even those most experienced in intravenous therapy to be able to find a suitable vein for purposes of injection, and if such persons are attacked by malaria, with frequent vomiting, one has to decide between exposing a vein by incision and the administration of an intramuscular injection and, except in desperate cases, the latter method is the lesser of two evils.

It cannot be doubted that the indiscriminate use of the intramuscular method of administering quinine is strongly to be deprecated on account of the very definite risks if the most scrupulous care is not taken to ensure the sterility of the syringe and of the injected fluid; but, on the other hand, the sweeping assertions made by Majors Acton and Chopra are liable to induce practitioners to deprive certain cases of a most valuable method of treatment.

The term malpraxis is an ugly one with a very definite legal significance: It should not be used lightly and certainly not in connection with a method which most of us have been taught to use, with discrimination by those most eminent and experienced in the practice of tropical medicine.

It is to be hoped that, bearing in mind the warnings of Majors Acton and Chopra with regard to the ease with which the necrotic areas become infected by pathogenic organisms and guided by their work in the choice of a suitable preparation, practitioners will continue to use intramuscular injections when indicated. —Yours, etc.,

G. R. McROBERT, M.D., M.R.C.P. D.T.M. & H.,
Capt., I.M.S.

DERA ISMAIL KHAN,
8th December, 1924.

INTRAVENOUS IODINE INJECTIONS.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—Ever since the advent of an article by Lieut. Colonel W. W. Jeudwine, I.M.S., on the therapeutic value of intravenous iodine injections (*Indian Medical Gazette*, December 1923), quite an avalanche of letters and articles has appeared on the subject. I personally

drew attention to the value of this drug in septic conditions in 1921 (*Indian Medical Gazette*, October 19, 1921) and have had a long record of success ever since in many other infections. My case of severe pyæmia was mentioned in your issue for April 1922, p. 151.

My latest successes with intravenous iodine treatment have been four cases of pneumonia. My largest dose in a pneumonia case has been 60 m.; and that has been as a third injection. I now never use less than 20 m. in 10 c.c. of normal saline for a first dose, in whatever affection I am using the drug; and according to the reaction obtained increase by 10 m. or 20 m. for subsequent doses.

I have for long now discontinued the use of the B. P. tincture for an aqueous solution, which does away with the fear of thrombosis, and I offer this advice to others using iodine intravenously.

In pneumonia although the disease is not cut short, the grave and distressing symptoms are quite abolished, the ratio between pulse and respiration is maintained, and dyspnoea is scarcely ever noticed, while resolution once started is rapid.

Last month in a case of acute rheumatic fever I had most gratifying results. The fever fell to normal after the first injection, and resolution in the affected joints with loss of pain was established in 36 hours. —Yours, etc.,

A. BAYLEY DE CASTRO,
Junior Medical Officer,
Haddo, Port Blair, Andaman Isles.

PORT BLAIR,
27th November, 1924.

[NOTE.—We do not know who was the first doctor to use iodine intravenously. It could not have been Hippocrates, since the element was as yet undiscovered in his day; but the method dates very far back. We believe that Lieut.-Colonel F. P. Connor, D.S.O., I.M.S., was the first surgeon in India to use it systematically, at first in cases of plague, and later in surgical sepsis, from about 1910. The special value of Colonel Jeudwine's article was that it constituted a review of a very large series of cases, gave a detailed technique, and a collected volume of evidence in favour of the method.—EDITOR, I.M.G.]

A YOUNG DOCTOR'S VIEWS OF OLD DOCTORS.

WE have received a very interesting letter from a young doctor in the Madras Presidency. He points out that the older doctors are useless and that their interests lie chiefly in the study of regulations. They are addicted to the monotonous repetition of quinine mixture. In short, the old doctors are expensive nuisances who ought to be superannuated at once to make way for the younger and more enthusiastic men.

The future of medicine in Madras must be bright indeed if the young doctor's picture of the junior medical men is a true one. They are full of zeal and energy, their eyes are glued to the microscope and when they hear that one of the old doctors is engaged in murdering a patient they at once rush to the help of the victim and in due course save his life. Apparently these young men have already secured lucrative practices as is only right, but they cannot bear to see the terrible waste of Government money, and they are prepared instantly to take the places which will be vacated when the old stagers of forty and fifty are consigned to a well-merited or forcible retirement.

The last words of the letter will show the drift of the argument. They are:—"With the money saved by the compulsory retirement of the 'seniors' double the number of young active and fresh men may be employed, and thus the quality of work turned out by the subordinate medical officers considerably improved and the popularity of the allopathic dispensaries revived and enhanced. Let us hope that everything will turn out in our favour."

We have derived considerable satisfaction from reading this letter which is like a cool breeze on a stifling day. Surely the time is not far distant when the young medical men will assert their rights, if necessary by the use of some really modern method such as the "death ray" of the great Grindell Matthews.

There is only one thing that distresses us. We hope that our correspondent does not seriously propose the revival of the obsolete "allopathic system." We have no more desire to see it rise from the grave than to see restored to life other relics of antiquity like the Ayurvedic and Unani systems. Modern scientific medicine holds no brief for any "system."—EDITOR, *I.M.G.*

YAWS IN INDIA.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—One frequently comes across remarks in medical journals or books that frambœsia or yaws is very rarely, if at all, seen in India. Thus Dr. H. T. Holland, in describing his case of gangosa in Baluchistan, in your issue for last August, writes that yaws is very rare or unknown in that part of India. Dr. Manson-Bahr remarks, however, that "the exact distribution of yaws in India and China is unknown."

Travancore is a very progressive modern native State in the south of India, maintaining a considerable number of district hospitals and dispensaries. In central Travancore, I am well acquainted with about a dozen taluks in which large numbers of cases of yaws are being admitted to the district hospitals and dispensaries. Although my experience of other taluks is not sufficient upon which to base personal evidence, yet a number of my colleagues have informed me that yaws is relatively common in out-patient work in this State; so much so, indeed, that a stock "yaws' mixture" is in general use, which contains antimony tartrate.

As regards the diagnosis of the disease, one cannot err, as the typical seab, mode of infection, constitutional changes and the nature of the big and ugly scars and deformities formed after healing of the lesions are very characteristic. In two or three hospitals which I have visited cases of yaws present themselves as out-patients almost every day. The disease is generally met with in low-class people of dirty and insanitary habits.

Yaws is at least not rare in Southern India.—Yours, etc.,

M. A. KRISHNA IYER, L.M.P.

NATCHARKOIL, TANJORE DISTRICT.
1st December, 1924.

DIARRHŒA IN THE BREAST-FED INFANT.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—Since your publication of my article on the "Digestive Ailments of Children" in your March 1924 number, I have been inundated with hundreds of enquiries from practitioners all over India as to the correct treatment of that devastating condition—the green or yellow diarrhœa of the breast-fed infant. May I, therefore, crave the hospitality of your correspondence columns to answer these enquiries, for it is in the hot months that this condition is most serious.

I have been investigating these cases for many years, and find that the analyses of the breast milk, and infants' stools and urine, prove that in 70 per cent. of cases excess of carbohydrates or fat is the cause; and of the remaining 30 per cent. of cases, in 25 per cent. excess of protein is at the root of the trouble.

I lay stress on this subject because my experience as a consultant convinces me that, since its pathology is not understood by practitioners, many of these infants die, others are ill for weeks, whilst others are rapidly and unwisely taken off the mother's milk and

put on to some proprietary milk food, with the result in some, of acute gastro-enteritis, acidosis, and death; in others, eventually the whole gamut of symptoms of rickets or chronic gastro-intestinal catarrh supervenes.

My investigations have taught me that any drug, and especially grey powder and castor oil emulsion, is bad medicine and worse practice. What you must do is:—

(1) See that the nipples are kept scrupulously clean before and after each feed; and the mouth of the infant kept clean.

(2) Have the baby fed at both breasts for 7 minutes three hourly, and before it is put to the breast give 1 oz. of boiled water in which 5 grains of bicarbonate of soda have been dissolved.

(3) Between the feeds give a solution of $\frac{1}{4}$ per cent. sodium bicarbonate and $\frac{1}{4}$ per cent. saline solution, as much as desired, making it palatable with a fractional quantity of saccharine. Perhaps I need not remind your readers that $\frac{1}{4}$ per cent. is roughly a quarter of a teaspoonful to the pint of boiled water. If any œdema occurs stop the saline but go on with the sodium bicarbonate.

(4) The mother is to avoid constipation, and regularly drink a whole tumbler of water before each breast feed is due.

(5) She should not take in excess those things beloved of nurses, i.e., cotton seed, vast quantities of milk, sago, and the like, which only cause distension and constipation; for remember that the best galactagogue is the hungry infant fed at regular 3 hourly intervals.

(6) Each breast should be hot and cold sponged for a quarter of an hour twice daily, and gently massaged from the periphery to the nipple twice daily. She should rest on her bed from 12 noon to 3 p.m.

(7) Weigh the infant regularly before and after each breast feed at 6 a.m., 9 a.m., and 12 noon, and at 3, 6, and 9 p.m. for a few days, and check on a chart the gain in weight per feed. You will frequently find that the child is taking less, or more, at one or more feeds per day than at others. If less than it should be, you must supplement that feed with whey, or skimmed milk and water. For the first month dilute such milk 1 in 2, for the second month 1 in $1\frac{1}{2}$, and for the third month 1 in 1. The best diluent is boiled water (but if the child is debilitated clear whey is better than water as a diluent), sugar of milk half a teaspoon to 3 ozs. being added. If the gain is more than it should be at one feed, all that is necessary is to lessen the time at the breast.

On these lines you will rarely find it necessary to take the infant off the breast.

(8) If the case is an advanced one when you see it, you may do as above, or you may supplant one or two breast feeds by whey or skimmed milk, remembering that the stomach of an infant will not hold a greater quantity than 1 oz. over its age in months, e.g., if the baby is 4 months old 5 ozs. should be its feed.

(9) For the frequent small green slimy stools a warm water enema is often most useful.

If the buttocks are scalded, equal parts of zinc oxide and castor oil applied locally will allay the soreness.

(10) If the condition is a green lientéria,—that is the infant's bowels are moved immediately following its feed—2 to 5 drops of tinct. camph. co. before each feed will be found useful.

(11) Remember that a reliable pair of scales is the most important thing in prognosis and treatment.

(12) Comprehension of the pathology and treatment by the doctor, combined with confident co-operation on the part of the mother, is essential to success.

(13) Remember that breast feeding is Nature's provision. Next best to this is cow's or goat's milk. Never give proprietary milk foods if you would avoid rickets, spasmophilia, and gastro-intestinal complaints.

To take any infant off the breast, is, in nine cases out of ten, not only a grave error and responsibility,

but an insult to Nature and an aspersion on the knowledge of the practitioner.—Yours, etc.

V. B. GREEN-ARMYTAGE,
Major, I.M.S.

CALCUTTA,
14th January, 1925.

THE SHORT TERM COURSE: CALCUTTA SCHOOL OF TROPICAL MEDICINE.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—I shall be very glad if you kindly publish the following in your esteemed journal:—

The students who attend the 6 months' course in the Calcutta School of Tropical Medicine and pass the examination, obtain the Diploma in Tropical Medicine, and they can style themselves D.T.M. (Bengal). But those who attend the 3 months' course and pass the short course examination are granted a certificate only. They cannot use any title for their additional qualification. I would therefore submit the following for the consideration of the Faculty of Tropical Medicine and Hygiene, Bengal:—

That the students who attend the short course in tropical medicine and pass the examination, be granted a Licence in Tropical Medicine and Hygiene and they be permitted to style themselves "Licentiate in Tropical Medicine and Hygiene," L.T.M. & H. (Bengal), just as those passing the long course examination are entitled to style themselves D.T.M. (Bengal).—Yours, etc.,

A. PAUL,
Sub-Asst. Surgeon,
Certificate holder in Tropical Medicine
and Hygiene.

MAHIMAGANJ, RANGPUR,
9th November, 1924.

BRITISH INCOME-TAX REFUNDS.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—It does not appear to be generally known that claims for refund of British income-tax deducted from dividends, interest, rents, etc., received from Great Britain can now be made for the whole period since April 5th, 1920.

Formerly claims for recovery of tax were limited to three years. Now, however, under the Finance Act, 1923, this time limit has been extended to six years, but not so as to affect any years previous to 1920.

I might also point out that it makes no difference whether the income in question is derived from trustees in Great Britain, as in all cases a refund can be claimed.

I have gone into the matter very fully with the Inland Revenue lately, and if any of your readers are not aware of what claims can be preferred and will get in touch with me at 13, Buckingham Palace Gardens, London, S.W.1, I shall be happy to advise them.—Yours, etc.,

WILFRED T. FRY.

13, BUCKINGHAM PALACE GARDENS,
LONDON, S.W.1.
25th October, 1924.

Service Notes.

APPOINTMENTS AND TRANSFERS.

THE services of Colonel R. A. Needham, C.I.E., D.S.O., M.B., I.M.S., Deputy Director-General, Indian Medical Service, are placed at the disposal of the Railway

Department (Railway Board) for a period of one year, with effect from the 1st January, 1925.

Lieutenant-Colonel F. P. Connor, D.S.O., I.M.S., Professor of Clinical and Operative Surgery, Medical College, Calcutta, is appointed to officiate as Professor of Surgery of the Institution and Surgeon to the Medical College Hospitals, *vice* Lieutenant-Colonel R. P. Wilson, F.R.C.S., I.M.S., with effect from the date on which he took over charge.

Lieutenant-Colonel H. B. Steen is appointed to officiate as Professor of Clinical and Operative Surgery, Medical College, Calcutta, and Surgeon to the Medical College Hospitals, *vice* Lieutenant-Colonel F. P. Connor.

Lieutenant-Colonel J. Masson, M.B., F.R.C.S.E., I.M.S., is appointed to officiate as Inspector-General, Civil Hospitals, Bihar and Orissa, with effect from the 13th March, 1925.

Lieutenant-Colonel J. K. S. Fleming, O.B.E., I.M.S., is appointed Deputy Director-General, Indian Medical Service, with effect from the 1st January, 1925.

Lieutenant-Colonel J. D. Graham, C.I.E., M.B. I.M.S., officiating Public Health Commissioner with the Government of India, is confirmed in the appointment with effect from the 1st September, 1924.

Lieutenant-Colonel E. O. Thurston, Civil Surgeon, Hooghly, was appointed to act as Civil Surgeon, Serampore, from the 12th August to the 20th August, 1924, in addition to his own duties.

Major G. M. Millar, O.B.E., I.M.S., is appointed sub-stantively to be an Agency Surgeon under the Government of India in the Foreign and Political Department, with effect from the 3rd October, 1924.

The services of Major S. Gordon, M.C., I.M.S., are placed at the disposal of His Excellency the Commander-in-Chief, with effect from the date on which he reports himself for duty to the military authorities.

LEAVE.

Colonel H. Ainsworth, M.B., F.R.C.S., I.M.S., Inspector-General of Civil Hospitals, Bihar and Orissa, is granted leave on average pay for 5 months and 24 days and leave on half average pay for the remaining period up to a maximum of 8 months' leave in all, with effect from the 13th March, 1925, or the date on which he avails himself of the leave.

Lieutenant-Colonel J. B. D. Hunter, O.B.E., I.M.S., an Agency Surgeon, is granted leave on average pay for 7 months under the Fundamental Rules, with effect from the 20th October, 1924.

In modification of the orders already issued, Lieutenant-Colonel W. W. Jeudwine, C.M.C., I.M.S., Civil Surgeon, Simla West, is granted leave on average pay for 5 months and 19 days with effect from the afternoon of the 8th October, 1924.

In modification of this department notification No. 2856-Medl., dated the 15th November, 1923, granting combined leave for twelve months to Major E. W. O'G. Kirwan, I.M.S., First Resident Surgeon, Presidency General Hospital, Calcutta, the period of five months from the 6th February to the 5th July, 1924, both days inclusive, was commuted into study leave.

RETIREMENTS.

Lieutenant-Colonel Albert Elijah Walter, O.B.E. Dated 1st February, 1925.

Major A. E. Grisewod, I.M.S. Dated 10th December, 1924.

RESIGNATIONS.

Captain Arthur Leonard Watts, M.B. Dated 31st December, 1924.

Captain Muthu Ramkrishna Grandhi. Dated 1st September, 1924.

PROMOTIONS.

Captain (now Major) G. F. Graham, I.M.S., to be acting Lieutenant-Colonel while commanding No. 1, Combined Field Ambulance in East Africa from 16th April, 1917 to 2nd November, 1917 (inclusive).

NOTES.

LONDON SCHOOL OF HYGIENE AND
TROPICAL MEDICINE.
DIVISION OF TROPICAL MEDICINE AND
HYGIENE.

THE following medical officers passed the School examination at the termination of the 76th session (September-December, 1924):—

Passed with distinction:—

O'Flynn, J. A.—Winner of "Duncan" medal.
Dye, W. H.
Shelton, C. F.
Hynd, D.
Meek, A. I.
Banerjee, T. N.

Passed:—

| | |
|--------------------------|-----------------------|
| Suri, P. N. | Given, D. H. C. |
| Griffin, R. G. | Sweet, R. |
| Mallory, J. R. | Morton, Miss U. F. M. |
| Watkins-Pitchford, H. O. | Williams, A. D. |
| Caldwell, Miss H. M. | Hacker, H. P. |
| Khosla, R. N. | Naudi, J. |
| Grant, R. K. | Navaratnam, S. L. |
| Young, D. Murray. | de Silva, D. M. |
| Quin, H. C. E. | Mankarius, A. Y. |
| Gohar, M. A. El. H. | Harley-Mason, R. J. |
| Louw, G. | Smith, P. H. S. |
| Follit, H. B. | Batra, K. R. |
| de Bono, M. | Newton, I. |
| Robinson, G. | Wall, A. E. |
| Campbell, R. F. | Khan, S. |
| Kahawita, D. L. J. | Lonie, T. C. |
| Lang, Milton C. | Evans, E. H. |
| Closson, Miss E. M. | Chappel, Miss M. C. |
| Goldberg, H. | Bradbury, W. |
| Hopkinson, H. C. | Bartholomeusz, W. A. |
| Gill, C. E. G. | Sammons, Miss M. G. |
| Cassidy, M. A. | McKernan, F. |
| Hart, W. H. | |

16th December, 1924.

THE BRITISH EMPIRE EXHIBITION 1924.

Mav and Baker's Exhibit.

THE reputation which the manufacturers of the well-known "Planet Brand" of fine chemicals and medicinal products have attained is fully upheld by their handsome exhibit. The specimens shewn are all of the firm's manufacture and are guaranteed to have been drawn from their ordinary stock.

A case containing antisyphilitics occupies a prominent position. The compound *Novarsenobillon* is well-known, and maintains its reputation as second to none in all-round efficiency. *Arsenoargenticum* (Sodium Silver Arsenobillon) and the bismuth compounds *Luaton* and *Rubyl*, are also shewn. The two last-named, though in general less effective than arsenical compounds, have sometimes succeeded where both arsenic and mercury have failed.

A product interesting to overseas practitioners is *Stovarsol*, an organic arsenical compound which is taking a foremost place as the most effective remedy in anaemic dysentery, and has had marked success in yaws. Good results have also been obtained in the treatment of lamblasis. The marked parasitocidal properties of *Stovarsol*, are due to its high arsenic content, notwithstanding which it is of very low toxicity to the human organism. It is supplied in tablets for oral administration, which renders it most convenient in use.

Special reference should be made to a new hypnotic and analgesic brought forward under the name of *Soneryl*, a product of proved efficiency, possessing

the important advantage of causing no deleterious after-effects.

The manufacture of bismuth salts forms a most important branch of the firm's activities. A wide selection is shewn, specially prominent being a large show-jar of bismuth carbonate. This is extraordinarily light and impalpable, a property which is indispensable for medicinal use in view of the mechanical action of the product in protecting the digestive tract from irritation.

Mercurials form an imposing display in a large case made for the *Exhibition of Industries of all Nations* held in Hyde Park, London, in 1851. The large variety shewn illustrates the wide range of these products manufactured by the firm.

A brilliant display of *Camphor* in cubes, in coloured transparent airtight wrapping, is arranged in pyramids of red, white and blue. The transparency of the *Camphor* has been most effectively preserved.

A special case is given to *Strychnine* and its salts of which the firm make immense quantities. The excellence of the crystals provoked much comment.

Baker's anæsthetic ether, also *Chloroform*, which enjoy an unexcelled reputation for purity and effectiveness are represented by bottles carrying the firm's distinctive label.

A feature which has arrested the attention of many observers is a selection of old containers, including jars, pots, and bottles belonging to past centuries in British history, and also to ancient times, reaching back even to 2500 B.C. These furnish interesting comparisons between products of ancient and modern times.

The very large number of other products shewn include *Scale Preparations*, *Citrates*, *Tartrates*, *Alkaloids*, and other compounds for both medicinal and industrial purposes, which by reason of their excellence have attained a world-wide reputation.

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Original Articles.

COMBINED CARBON TETRACHLORIDE AND OIL OF CHENOPODIUM IN THE TREATMENT OF HOOKWORM DISEASE.

A REPORT ON THE TREATMENT OF 70 CASES.

By ASA C. CHANDLER, Ph.D.

and

A. K. MUKERJI, M.B.

(From the Hookworm Research Laboratory, Indian Jute Mills Association Endowment, Calcutta School of Tropical Medicine and Hygiene.)

WITH the introduction of carbon tetrachloride in the treatment of hookworm infections, interest in oil of chenopodium and its active principle, ascaridol, has decreased. Nearly all of the extensive tests which have been made on carbon tetrachloride have been made in countries where *Necator americanus* constitutes the great majority of hookworms harboured, and that carbon tetrachloride is more effective against this worm than is oil of chenopodium has been conclusively demonstrated. In the few instances in which carbon tetrachloride has been tested on patients harbouring a considerable proportion of *Ancylostoma duodenale* (e.g., Sawyer and Sweet, 1924; Cadbury, 1924; and Chandler and Mukerji, 1925) it has been shown that its efficiency against this worm is markedly lower, and usually less than is the case with oil of chenopodium. It has also been shown that carbon tetrachloride is much less effective against *Ascaris* infections than is oil of chenopodium.

For these reasons a number of workers have experimented with a combination of carbon tetrachloride and oil of chenopodium or ascaridol. Smillie and Pessoa (1922) found that neither drug increased the toxicity of the other and that their actions were complementary to each other, the carbon tetrachloride being especially active against female hookworms (*Necator*) and the ascaridol against male hookworms and *Ascaris*. They recommended 2 c.c. of a three-to-one mixture of carbon tetrachloride and ascaridol. Lambert (1923) having had several fatalities after carbon tetrachloride treatment of patients harbouring numerous *Ascaris*, and suspecting the possibility of the latter having been in part responsible, tried a combination of 10 parts carbon tetrachloride in the usual dosage of 3 to 4 c.c. with one part of oil of chenopodium, and was well pleased with the results obtained. Bereovitz (1924), in China, adopted Lambert's method and considers it safe and effective, and states that numerous *Ascaris* are expelled by it. Lambert later (1924) tried a combination of four parts of carbon tetrachloride to one part of ascaridol, and considers this the best anthelmintic yet found for mixed hookworm and *Ascaris* infections. Reed (1923), in Borneo, gave 60 minims of

carbon tetrachloride with one c.c. (16 minims) of oil of chenopodium and $\frac{1}{2}$ an ounce of liquid paraffin. He says this practically never fails to remove *Ascaris* and believes it to be more effective for hookworms than carbon tetrachloride alone. Kehrer and Soemadijono (1923), in the Dutch East Indies, recommend a mixture of four to five c.c. of carbon tetrachloride and 1.5 c.c. of oil of chenopodium as being the most effective combination. Soper (1924), in Paraguay, tried 2.4 c.c. of a combination of three parts carbon tetrachloride and one part oil of chenopodium on 40 heavily infected cases; he obtained 10 per cent. of worm-count cures and 35 per cent. of microscopic cures (Willis' method) and a removal of 96.5 per cent. of worms. He considers this treatment very effective in places where *Necator* is the predominant worm. The work of Sawyer and Sweet (1924), in Australia, constitutes the only contradictory evidence; their results, on groups of 24 patients each, showed a lower percentage of cures and of worms removed after treatment with a combination of 5 c.c. carbon tetrachloride and 0.75 c.c. oil of chenopodium than with either carbon tetrachloride (5 c.c.) or oil of chenopodium (1.5 c.c. in 3 divided doses) alone.

At the Carmichael Hospital for Tropical Diseases in Calcutta 22 patients were treated with a combination of 50 to 60 minims of carbon tetrachloride and 10 to 15 minims of oil of chenopodium, by Dr. J. Borland McVail, in 1922. The excellent results obtained by him, together with the favourable reports from elsewhere, stimulated us to try a combination of these two drugs on a further series of cases. Dr. McVail gave the chenopodium in a capsule, accompanied by the carbon tetrachloride in water and followed by one ounce of saturated magnesium sulphate two hours later. In our further series of cases the same method was used except that the carbon tetrachloride was administered in milk, this having been found to be the best method of administration (Chandler and Mukerji, 1925).

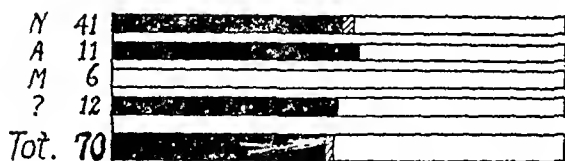
Practically all the cases with which we have to deal are lightly infected; the highest number of worms recovered from any one case in the present series was 94, and in most cases it has been less than 50 and in many of them less than 10. Our experience corroborates that of Darling, Soper and others that the percentage of worms removed in light infections is lower than in heavy infections; and we have found that the percentage of worms removed in light infections, by an initial treatment, varies greatly in different individuals from 100 per cent. to less than 20 per cent., regardless of the treatment used. In one case, for instance, which was treated twice with 70 minims of carbon tetrachloride, 21 ankylostomes were removed by the first treatment and 118 by the second. In one case treated by a combination of carbon tetrachloride and chenopodium, 8 ankylostomes were removed by the first treatment, and 39 by the second. Furthermore,

worms are sometimes passed later than three or even five days after treatment, and we are convinced, in spite of all precautions which we have found practical, that stools of hospital patients are sometimes lost. Since all of these factors tend to reduce the accuracy of data on percentage of worms removed, and since it is our experience that the percentage of worms removed increases concomitantly with the percentage of absolute cures, at least in light cases, we think the percentage of microscopic cures is the better criterion of the effectiveness of anthelmintics in these light cases, and have based our conclusions on this. Our criterion of cure has been a series of at least six negative examinations by the Kofoid and Barber technique, the last one being at least 15 days after treatment. Some of the earlier cases in which this rigid criterion was not followed, but in which the evidence indicated a possible microscopic cure, are classed as uncertain cures.

Seventy cases in all have been treated in the Carmichael Hospital with a combination of carbon tetrachloride and oil of chenopodium, on the basis of 60 minims of the former to 15 minims of the latter for a normal adult. Of these cases 41 were pure *Necator* infections, 11 pure *Ancylostoma* infections, 6 mixed infections, and 12 of undetermined species. The following chart shows graphically the percentage of cures obtained in these various groups by the combination treatment, as compared with various methods of administration of carbon tetrachloride and oil of chenopodium.

CHART I.

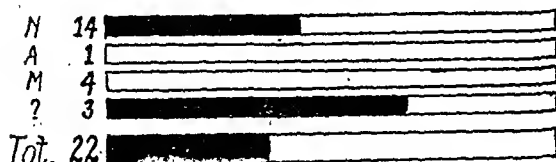
A comparison of the results of various methods of administration of Carbon tetrachloride and Oil of Chenopodium on *Necator*, *Ancylostoma* and Mixed Infections. N = Pure *Necator*. A = Pure *Ancylostoma*. M = Mixed infection. ? = Undetermined species. Solid black indicates percentage of certain cures. Stripes indicate additional possible cures.



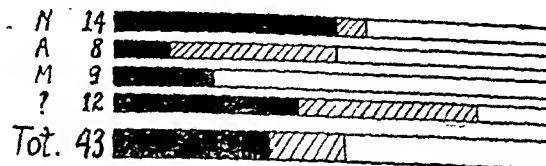
CCl₄ 60 mins. in milk; Chen. 15 mins. in capsule; salts after two hours.



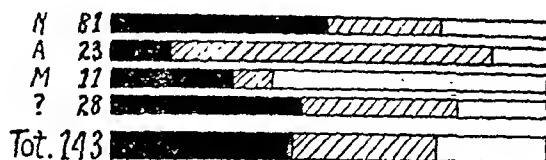
CCl₄ 70 mins. in milk, salts after two hours.



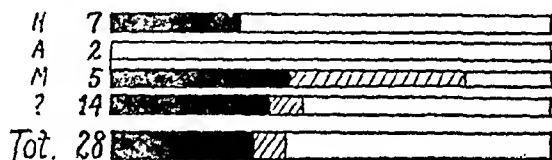
CCl₄ 70 mins. in milk, no purge.



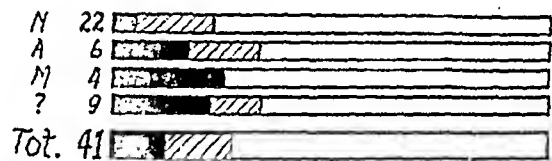
CCl₄ 70 mins. repeated next day; with or without purge.



CCl₄ 70 mins. in 1 oz. sat. mag. sulph. sol., repeated next day.



CCl₄ 70 mins. in water, no purge.



Ol. Chen. 30 mins. in 3 divided doses of 10 mins. each 1 hour apart. Salts after two hours.

It will be observed that the percentage of cures obtained by 70 minims of carbon tetrachloride in milk followed by salts two hours later is higher for *Necator* infections than by any other method, but that the combination treatment comes next. On the other hand it will be observed that the percentage of *Ancylostoma* cases cured by the combination treatment is strikingly higher than with any other method. Only six cases of mixed infections were treated, none of which were cured, but it is significant that in only one of these mixed cases were any ankylostomes passed after the first treatment, whereas after carbon tetrachloride the *Necators* always tend to be eliminated first. Only 22 cases have been given second treatments, and only six of these were cured, four of them pure *Necator*, one *Ancylostoma*, and one undetermined infection. Nine *Necator*, one *Ancylostoma*, four mixed, and two undetermined cases failed to clear up on the second treatment. Of seven cases given a third treatment, one *Necator*, and one mixed (now pure *Necator*) infection were cured, whereas three *Necator*, one mixed, and one undetermined infection were still positive. One of the *Necator* infections cleared up after the fourth treatment.

Since all of our cases which were harbouring *Ascaris* were treated by another method we have no data on the efficiency of this treatment in curing *Ascaris* infections, but the testimony of others already quoted leaves little room for doubt but that it is highly effective.

As regards effects on the patients, we have observed very few symptoms, less in fact than in patients treated with 70 minims of carbon tetrachloride alone. The usual slight giddiness which ordinarily follows the administration of carbon tetrachloride has apparently been absent in many of these cases, and in only one instance has vomiting occurred immediately after administration. Many patients, however, vomited after the magnesium sulphate had been given. No prolonged nausea and no toxic symptoms have been observed. We are convinced that the usual dosage of carbon tetrachloride, 3 to 4 c.c., is quite as safe when given with 15 minims of chenopodium as without it.

From the results we have obtained we do not think that the addition of chenopodium to carbon tetrachloride is of any value in pure *Necator* infections, but the evidence, so far as it can be judged from a small number of cases, is strong that the combined drugs have a considerably more powerful effect on *Ancylostoma* than has either drug alone. In places where *Ancylostoma* and *Ascaris* infections are common, therefore, we agree with Lambert, Reed, Bercovitz and others that a combination of carbon tetrachloride and oil of chenopodium is the best anthelmintic to use. The dosage we have employed, of 60 minims of carbon tetrachloride in milk and 15 minims of oil of chenopodium in a capsule, we consider safe for controlled patients; for field work on a large scale a smaller dose of these drugs in the same proportions might be preferable. It is significant, however, that the fatal cases of carbon tetrachloride poisoning have always followed small doses, indicating, as we have pointed out before, that the condition and diet of the patient is a more important factor than the size of the dose.

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CLINICAL STUDIES ON DIGITALIS IN BENGAL.

By S. C. BOSE, M.B., M.R.C.P. (London), D.T.M. (London),

Physician, Cardiac Department, Carmichael Medical College Hospitals, Calcutta.

SHORTLY after my return in 1922 from the heart clinic of Sir Thomas Lewis at the University College Hospital, London, I commenced a study of heart diseases as met with in Calcutta. My observations were largely made on private patients at their homes, with the obvious advantage of following these cases up for over two years. In all cases Lewis' method of working up and recording them was followed, and polygraphic tracings were taken whenever required. Unfortunately, however, it was not always possible to record the daily output of urine, the hours of sleep, and other details as accurately as they would be done in a hospital. Nevertheless, many striking facts were brought to light, and some of these relate especially to the behaviour of digitalis in cases of heart failure. Since some of these results are at variance with those obtained by Mackenzie, Lewis and others, special care was taken to ensure accuracy. To facilitate a better understanding of these problems, it has been found necessary to discuss some points before mentioning the procedure that was followed.

Choice of Preparation.—The B. P. preparations in common use are the tincture, infusion and pulvis digitalis. So far, we have not isolated any single pure glucoside which may be regarded as the essentially active principle.

The tendency therefore is to administer the whole drug, including as many glucosides, etc., as possible. Recent experiences in America and Germany have favoured the use of the powdered leaf, and it is claimed that this gives the most certain and favourable results, but there are numerous practical objections to the routine use of the powdered digitalis leaf in India. To be physiologically active, several conditions must be fulfilled:—

- (1) The folia must have been of the second year; (2) collected at the proper season; (3) dried for some hours at 60° C. to destroy the ferments, otherwise the glucosides will be rapidly destroyed; (4) kept dry, free from dust, heat and strong light; (5) not touched with moist hands, otherwise they will be overgrown with fungi; and (6) lastly, an alcoholic tincture made

from these folia should be biologically assayed to prove the potency of the leaf.

It is futile to expect that every sample of powdered leaf has satisfied all these conditions. Bad leaf, badly stored, when pulverised, would possibly be "Pulv. digitalis with fungi without glucosides." To sum up, therefore, pulv. digitalis as served up by local chemists in the *mofussil* is a preparation regarding which (1) one does not know whether it was ever physiologically active, and (2) whether such activity has been retained on storage.

With regard to infusion of digitalis much greater uncertainty prevails. The physician is probably asking for the freshly made infusion, but in most cases the druggist opens a stocked liquid drug which is imported and labelled as "Infusion of digitalis, concentrated." The druggist dilutes this to 1 in 8 and serves it out as the B. P. infusion of digitalis. Many druggists have confessed that this is their usual practice. What life-saving property will this miserable old infusion be likely to possess? Assuming that the infusion is freshly made, the leaf has not been standardised, and may be defective. Further, the leaves are usually infused for a few moments only, and very little of the active constituents are diffused into the water. The best infusion is obtained by following the directions of the U. S. pharmacopœia, where it must stand for one hour, and a little alcohol is added before straining. With all conditions properly fulfilled, the longest period that an active infusion can last is one week.

Lastly we arrive at the tincture. The reasons for preferring the standardised tincture are numerous and weighty. We have favourable reports by most cardiologists on the tincture. Further, each specimen, before being bottled, is chemically and biologically tested in terms of "heart tonic units." Most of our cases of heart failure are *in extremis* and require an active preparation which is readily absorbed. The standardised alcoholic tincture fulfils these requirements. But there is one serious and unavoidable defect in the tincture, viz., its gradual deterioration with age, and great loss of potency. In these clinical studies, this aspect of deterioration and loss of potency has been studied. This fact must be clearly remembered, otherwise valuable lives may be lost. There is only one immediate remedy for this defect, a remedy in the hands of all practitioners, and it lies in the use of massive doses of the best tincture, heedless of the posological tables and the alarm of the druggist. Through the courtesy and with the help of Major R. N. Chopra, I.M.S., and Capt. P. De. (T.C.), experimental studies with various samples of the tincture as actually used on patients have been made, and these results have been reported elsewhere in the March number of this journal.

Having chosen the standardised tincture, it was found that the best results were obtained by procuring an original 4-ounce bottle direct from

the agents, with instructions to supply from the latest consignment.

This bottle was kept in a cool, dark place, each dose was accurately measured out, and the bottle was at once tightly corked. This dose of tincture was diluted with water and taken at once on an empty stomach. In practically all these cases this method of administering digitalis was followed.

In passing, mention might be made of the use of Native's digitalin granules in two cases of heart failure complicating uræmia, which had failed to respond to the tinctures of digitalis and strophanthus. Both these cases did badly and died. In two other cases rectal administration of the tincture diluted with normal saline was beneficial. In no case was digitalin injected, since Mackenzie states it to be useless, but several desperately grave cases received instead an initial injection of Merck's G. strophanthin, gr. 1/200 intravenously with immediate and striking benefit.

Dosage.—With regard to dosage, digitalis stands apart from other drugs as being unique. With our present-day knowledge of the mode of action of digitalis in heart failure, for all practical purposes it is quite useless to mark the dose as 5 to 15 minims. In fact this officially prescribed dosage is a fruitful source of unwarranted caution and alarm on the part of the physician. Let us at the outset understand the essential principles concerned. The dose of any drug should be adjusted only according to its therapeutic utility. Digitalis can fulfil its purpose only when a certain large quantity has been given and has accumulated in the system in a certain period. Other active drugs such as belladonna, opium or *Cannabis indica* usually exert their respective therapeutic effects with 2 or 3 full doses according to the B. P. Thus with these drugs the therapeutic dose is nearly equal to the maximum B. P. dose. Digitalis, however, behaves quite differently. Though the maximum B. P. dose is 15 minims, one does not get any therapeutic effect unless a total dose of about half an ounce of the standardised tincture is taken. That is to say, it takes at least 240 minims, or 16 times the maximum B. P. dose before therapeutic effects are obtained. This is the finding of British and American workers. From this it follows that it is futile to remember and administer the B. P. dose of 10 or 15 minims when faced with a dying case. Cary Eggleston was the first to calculate the total dose of digitalis required on the basis of the weight and musculature of the patient. The more muscular the man, the heavier is his heart, and thus he would require a great deal more digitalis for therapeutic effects. It has been ascertained by Eggleston that 15 c.c., or 4½ fluid drachms of the standardised tincture, is required to "digitalise" a man weighing 100 lbs. Taking this as the average total dose required, the rational way of prescribing should be to

divide this up into a few big doses, according to the urgency of the case. In moribund patients with heart disease, the safe initial dose should be $1\frac{1}{2}$ or even 2 fluid drachms. This should be followed up by smaller doses of $\frac{1}{2}$ drachm every 4 or 6 hours, until the total required dose of 4 to 6 drachms has gone in. This method of "rapid digitalisation" results in equally rapid relief of distress and is not in any way dangerous.

While this rapid method may be a method of choice in Europe and America, one feels convinced, after a careful study in Calcutta of over 150 cases of heart failure, that it is the only method left to us when faced with a dying case and feebly armed with a weak, though standardised tincture of digitalis. In such cases one has often holdly administered a daily dose of 2 to 3 drachms for a couple of days with immediate relief. Children of from 6 to 12 years old stand proportionately big doses extremely well.

Indications in Chronic Heart Disease.—Until recently it was the general practice to administer digitalis indiscriminately. The hearing of a bruit anywhere over the præcordium conjured up the memory of digitalis. Fortunately, with the advent of newer knowledge, precise indications were laid down. The cardinal indication for the use of digitalis may be summed up in two words, *heart failure*. Obviously, the earlier the stage in which treatment is begun, the better it works. Heart failure includes a group of distressing symptoms, such as dyspnoea, cough, præcordial pain, and extreme exhaustion. The physical signs of venous congestion and other sequelæ usually appear later than the symptoms, and must therefore be regarded as late events. The earliest stage of failure, which is totally devoid of gross physical signs, must be correctly diagnosed. Diagnosis is rendered easy by a comparison with the patient's previous exercise tolerance, and by the presence of cardiac enlargement, with or without valvular disease. In the presence of these factors, we should regard these symptoms of distress as early evidences of heart failure.

Recently, however, the tendency is to give digitalis and also try to discover the root cause underlying heart failure. There are two conditions which precipitate the onset of heart failure. Firstly, the presence of a grave though obscure infection in some part of the body; and secondly, the onset of an abnormal rhythm with tachycardia, as in auricular fibrillation. The infective cause is by far the commonest, and therefore prompt attention to this root cause often succeeds admirably. But this alone does not suffice, and one has been compelled to advise such patients to invest in a bottle of standardised tincture of digitalis for the first few weeks. This dual measure improves the progress of the case, after which the patient can afford to do without digitalis. In the second group of cases,

with heart failure there is abnormal rhythm with tachycardia, as in auricular fibrillation.

Both Mackenzie and Lewis emphatically state that auricular fibrillation with ventricular tachycardia constitute the cardinal indication for the use of digitalis. Lewis writes, "The giving of digitalis to unselected heart cases is much to be deplored. Those who regard digitalis as a cardiac stimulant mistake its character; its chief action is to rest the heart. To the heart, fox-glove is not tonic but powerfully hypnotic. It controls the diastole of the heart; it extends the period of ventricular sleep." According to Lewis, there is no direct proof that digitalis is beneficial in cases of heart failure, except in those associated with auricular fibrillation. It is his conviction that digitalis owes its therapeutic success essentially to its power of blocking the passage of impulses from the auricle to the ventricle. By doing this in a case of auricular fibrillation with high ventricular rates, it gives the ventricles rest. This rest revives them, and thus they work efficiently.

With this view, however, many British and American physicians disagree. They maintain that though in all other cases the benefit derived from digitalis is not as definite and dramatic as in cases with auricular fibrillation, still a good proportion of cases with heart failure with normal rhythm improve with digitalis. The present study of a series of over 150 cases of heart failure in Calcutta has revealed some instructive points. The most striking finding in Calcutta is the extremely low percentage of cases of auricular fibrillation. The statistics of the different heart clinics in Europe and America tell us that in about 66 per cent. of all cases of heart failure there is auricular fibrillation, with or without tachycardia. But in the present series of 150 cases, only 9 cases had auricular fibrillation, or only 6 per cent. This extremely low incidence of auricular fibrillation among the cases of heart failure raises a difficulty in their treatment. Those who belong to Lewis' school would not use digitalis in these 94 per cent. of cases. Personally, I did not use digitalis in the beginning, but the results were disappointing.

Absolute rest in bed, proper diet, sleep and elimination did not cause improvement, therefore digitalis therapy was added, often with conspicuous benefit.

To sum up, the presence of definite symptoms or signs pointing to heart failure fully justifies the free, and often extravagant use of digitalis. Whether there is auricular fibrillation or a normal physiological rhythm or a normal heart rate does not matter. With this measure, however, any associated infection present anywhere in the body must be radically treated, otherwise results will be disappointing. It is not an exaggeration to state that the profession has not paid sufficient heed to these "focal infections," which drag over

90 per cent. of our heart failure cases down to the grave.

Contra-indications.—While limiting ourselves to cases of heart failure in the course of chronic heart disease only, very few contra-indications really exist. Text books mention that digitalis must not be used in cases of paroxysmal auricular fibrillation and in partial heart-block. Both these conditions may be regarded as clinical curiosities in the cases which we meet with in this country, the incidence of either of these being less than 2 per cent. By studying facts and ignoring catch phrases one can conclude that—provided heart failure is definitely present—there is hardly any contra-indication to digitalis worth consideration. Some doubt exists with regard to the procedure to adopt in cases of complete heart block, which have numbered as much as 5 per cent. in this series. Two of these cases have alternately reverted to normal rhythm quite suddenly and subsequently relapsed. Such cases have complete auricular-ventricular bundle-block only as a transient phenomenon. In these rare cases, therefore, digitalis can do harm by converting this temporary block into a permanent one. Once a case has developed by itself into permanent and complete auricular-ventricular block, no further mischief can be caused by digitalis. On the other hand, one has found digitalis therapy in two cases of complete heart block to be followed by a slight increase in the ventricular rate with a better exercise tolerance in the patient. Advanced pregnancy is no contra-indication, and a good many patients with grave heart failure complicating pregnancy have been safely tided over the crisis by bold digitalis medication.

Clinical Results.—In the course of these studies several difficulties were met with. These difficulties serve to illustrate two well-known but ill-remembered clinical truths. Firstly, one's clinical instinct and insight are often clouded by preconceived ideas; secondly, impressions based on a rough clinical study are often quite wrong and differ widely from the results arrived at by accurate and painstaking work.

Massive Dosage Required.—The question of dosage will be taken up first. All workers are agreed that it takes from 4 to 6 drachms of the standardised tincture to digitalise a case of heart failure. Further, Mackenzie states that digitalis has very little capacity to slow the tachycardia which starts in a normal manner at the sino-auricular node.

Therefore in this uncertain group of non-fibrillating cases not easily amenable to digitalis medication, one expected that it would take a bigger dose to make any impression. The group of heart failure cases that were first seen were treated as usual without any digitalis. Some of these did well, but the majority did not progress. Finally these were put on digitalis, more from scepticism and clinical curiosity than any conviction.

Usually, 15 to 20 minims of the standardised tincture was prescribed, along with alkaline diuretics in a mixture three times a day. It was noted that most of these patients stuck to their bottle regularly for months without the least sign of cumulation, and with varying benefit. At first, this fact seemed a little surprising, but the surprise was countered by two considerations:—(1) These cases, not being 'auricular fibrillators,' would consume relatively more digitalis, and (2) digitalis mixed with other drugs would lose its potency *after* being made up by the chemists. Thus, in spite of all these doubts, one still believed and taught in the wards that in this country it takes 4 to 6 drachms of the standardised tincture to bring on digitalis cumulation as in Europe and America. One never bothered even to add up the daily doses to find out the actual quantity required. At last, in August 1923, a European patient came for treatment for cardiac debility. Auricular fibrillation was present with a ventricular tachycardia of 140. It was decided to slow down this tachycardia rapidly by digitalis and then to put him on to quinidine. To get the quickest and most certain results, the patient was given an original 4-ounce bottle of the tincture direct from the manufacturers, with instructions to take 20 minims four times a day. With a daily dose of 80 minims one confidently predicted that by the 5th or 6th day his heart rate would be down to 80 per minute, the result of a total dose of 7 or 8 drachms. Contrary to expectation, however, the heart rate was still 120, and there was not the least sign of any intolerance. This patient eventually consumed 18 drachms in 13 days and had an intravenous injection of strophanthin before the rate fell to 80. Every case subsequent to this has been carefully dosed with digitalis, and one has not yet seen digitalis poison a single case of heart failure with a total dose of 4 or 5 drachms. In all the 9 cases of auricular fibrillation with tachycardia studied, the minimal total dose to produce minor toxic symptoms was 10 drachms and the highest was 21 drachms. Next, taking the big series (94 per cent.) of cases of myocardial degeneration with or without valvular disease, where there was heart failure with normal cardiac mechanism it was found that the smallest dose which produced minor toxic effects was 9 drachms, and the highest dose was 29 drachms in 26 days. One can recall 10 clear cases where a whole 4-ounce bottle of the tincture has been consumed within a month. Some of these have greatly benefited, but none of these 10 cases shewed toxic symptoms. This fact seems startling when Robinson cautions against the free use of digitalis in myocardial cases and writes, "the heart is often unusually susceptible to digitalis in the class of cases under consideration, and toxic effects may be produced by relatively small doses."

The massive doses have been worked out by carefully adding up the daily dose, whereas most of us had the impression that 4 to 6 drachms

alone would suffice in all cases. Several colleagues who have made their own observations recently, have also arrived at the same result. Some of them maintain that decided improvement in the patient's condition has not commenced before the 9th drachm or the limit of digitalis tolerance has been reached. But this is not the point in dispute. Clinically, improvement may commence with the first dose of digitalis or without any digitalis, where it is certainly due to other factors and not to the digitalis. Ordinarily one would expect a suitable case in cold countries to shew early toxic symptoms after 4 to 6 drachms of the tincture, but in this country it takes a minimum of 9 drachms to get the same toxic effects. This discussion as regards dosage is not merely academic. Ordinarily, practitioners have a feeling that the minimum dose of the B. P. is the optimum dose for an Indian. Even today there are many who stick to their 5 minim doses thrice daily. A week or ten days' trial is given; nothing happens, and the patient is regarded as incurable. If we remember that digitalis begins to act only after a good deal of it has been stored up in the body, we should not hesitate to start with massive doses in an endeavour to store it up quickly in the body. On an average, the human system can destroy about 22 minims of the tincture a day. Therefore, unless the initial daily dose was three or four times this quantity, there would not be much storing up of digitalis.

So far, it has not been possible to find out definitely which type or group of heart failure case requires the most massive dosage. On the whole it appears that the strongly built, heavy, middle-aged man invariably tolerates a bigger total dose than 10 drachms. Also the greater the initial hepatic enlargement and the deeper the icteric tinge present, the bigger the dose of digitalis that will be required. These no doubt are very rough guides, but this is as far as one's observations entitle one to state. Two illustrations from actual experience will perhaps convince the practitioner of the grave dangers attending the practice of giving too little digitalis.

The first case was a European male, aged 41, said to be suffering from severe dyspnoea, cough, palpitation and precordial pain for six months. This case was variously diagnosed and treated as bronchial asthma, renal asthma, etc., with no benefit. The next diagnosis made was cardiac asthma, for which plenty of camphor, caffeine and strychnine were prescribed, but only 10 minims of tincture of digitalis a day, and the patient was given up as quite hopeless. Ultimately the patient came under the writer's observation, when auricular fibrillation with grossly irregular ventricular tachycardia of 160 was discovered for the first time. The only drug prescribed was the standardised tincture of digitalis, besides an intravenous strophanthin (gr. 1/200) for its immediate effect. As the effect of the intravenous strophanthin passes off in 24 hours, digitalis was pushed with all haste. In such a grave case, one could have used half an ounce of tincture of digitalis as the initial dose, with perfect safety and with almost immediate results. Single big doses of 2 drachms have been recently tried in America and definite beneficial effects obtained in 24 hours. However, in the case in point,

2 drachm doses were given per diem. After one ounce had been taken in 4 days, the heart rate fell only to 120. It reached 84 only after 20 drachms had been taken in 12 days. In such a grave type of case, most commonly seen here, if one were not armed with Merck's strophanthin, and merely used 10 minims of tincture of digitalis thrice daily, the patient would have been dead long before digitalis had got a grip on his auricular-ventricular bundle. Knowing that digitalis is the sheet anchor in heart failure with auricular fibrillation, one completely ignored the posological tables and toxicological notes. The heart must be slowed down, and digitalis is our only weapon if used quite fearlessly.

A second case illustrating the danger of too little digitalis occurred in a Hindu female aged 22, with advanced heart failure and mitral stenosis, complicating 8 months' pregnancy. She had the same massive doses, and when her heart rate fell to 88 she had a premature labour, with very severe post-partum hæmorrhage. The child died shortly after birth, but the mother eventually walked out of hospital, apparently quite fit.

Looking back to the period spent in Sir Thomas Lewis' heart clinic, with several hundreds of heart cases passing through every month, one found really very few cases who first asked for treatment when too far gone. Most of those cases were in the early stages of heart failure. It was only rarely that intravenous strophanthin was found necessary; on the contrary it was interesting to observe that many of these heart failure cases got no drug at all for the first week to enable us to follow the therapeutic effects of physical and mental rest. Contrast with this the 20 per cent. of heart failure cases in Calcutta who received a full dose (gr. 1/125) of intravenous strophanthin before they could be trusted to survive the night. Obviously these 20 per cent. of cases required massive doses of digitalis by the mouth.

Another fact which one has noticed is the extremely good tolerance shewn by some children to proportionately big doses. A child of four with mitral stenosis, a dilated and failing heart, had a heart rate of 160 per minute. This child metabolised, as it were, 20 minims a day for one month, but the rate fell to 120 and no toxic symptoms occurred. Children from 6 to 8 years old have been successfully digitalised with an average total dose of 4 to 6 drachms in 12 days' time. In other words, a child of 8 in this country stands the same quantity of the tincture as a full-grown adult in Europe or America. Young persons from 12 to 15 years old can tolerate nearly the same massive doses as an adult. Mackenzie states that once a case of auricular fibrillation is fully under digitalis effect, it requires a very small dose of from 5 to 10 minims a day to keep the heart rate constant. On the contrary, all the cases of auricular fibrillation here have needed an average dose of 30 minims a day regularly for months to keep the rate at 80 to 90. Seeing that it takes anything from 2 to 4 times as much digitalis in this country to produce the same beneficial results on patients, both European and Indian as in England, we endeavoured to find an explanation for this remarkable discrepancy. A large series of heart failure cases

was treated with standardised tincture of digitalis bought direct from the manufacturers in original sealed 4-ounce bottles. It was noted how much was required to induce one or other of the cumulative effects. Each sample that was clinically tested on diseased persons was experimentally tested with a view to finding out exactly how deficient it was in the active principles. This comparative study of a large number of samples has yielded interesting results, which have been published in the March 1925 issue of this journal. While all these samples of tincture purchased and used in this country proved to be much weaker than the standard tincture as used in Europe and America, it seems also probable that some part of the ingested tincture is decomposed either in the alimentary tract or in the liver, and therefore does not reach the general circulation. Clinically it was found that those with the worst hepatic derangement consequent on passive congestion often needed and tolerated relatively more digitalis than others, and it is not unlikely that delay in absorption from the alimentary tract combined with further delay in the liver would determine the increased breaking down of some of the active principles.

Benefit.—(i) *Age.*—In estimating the benefit which may be expected from digitalis, the initial condition of the myocardium counts for a great deal. If the myocardium is relatively sound, as in younger persons, more benefit, both in degree and in duration, may be expected. All things being equal, the younger the age, the less grave the issue when digitalis has to be used.

(ii) The heart is normally smaller in women by nearly 2 ounces than in men. The myocardial efficiency may be said to be less, proportionately. Apart from this, it is difficult to state which sex is likely to do better. The imperative necessity of man to work for his living, though incapacitated, often nullifies all good results. Similarly the strain of repeated pregnancies and lactation proves equally disastrous in woman.

(iii) *Occupation.*—It is usually believed that the hard-working man fares the worst with heart disease, while the sedentary worker keeps better, once he has improved with treatment. This, however, is not strictly in accordance with one's own results. The man who is used to physical exertion has built up in the past a much stronger myocardium. Provided this type of patient cuts down his future work, he has a longer expectation of life before him than the person who has always been a clerk.

(iv) *Type of Disease.*—Chronic heart disease has three common causes: (a) the rheumatic group (10 to 30 years old); (b) the syphilitic group (30 to 50 years old); (c) the senile sclerosis group (45 years and onwards). Besides these, two minor groups may be added, (d) the hypertensive group, and (e) pregnancy with grave anæmia.

(a) *The rheumatic group.*—Digitalis most readily benefits the rheumatic group because the

heart muscle has a very good blood supply through fairly healthy coronary vessels. The presence of both aortic and mitral valvular damage makes the issue more unfavourable.

(b) *The syphilitic group.*—There is still considerable dispute regarding the behaviour of a syphilitic myocardium under digitalis.

There are several complicating factors such as the age of the patient, duration of infection, the stage of heart disease at which treatment is begun, past anti-luetic treatment, valvular disease as a complication, and syphilitic coronary sclerosis. It is therefore extremely difficult to conclude anything definitely. The heart cases in which digitalis is used here are cases of advanced cardiac failure. When such a grave case has also a strongly positive Wassermann reaction, one has not found it to survive more than 18 months, in spite of digitalis and full anti-syphilitic measures. By far the worst outlook is to be expected when the triad is present of advanced failure, free aortic regurgitation and active syphilis with a strongly positive Wassermann reaction. No case with this triad fully developed has survived longer than 12 months. The presence of aortic regurgitation adds a tremendous risk to the already failing syphilitic heart.

(c) *The senile sclerotic group.*—On *a priori* grounds one would expect an aged heart to fare the worst with digitalis. At one time it was taught that digitalis is dangerous to the senile heart. It was believed that a senile heart may have fatty changes, and may suddenly rupture with digitalis. This is no longer true. The fact is that digitalis most favourably effects a senile heart in failure. Quite a large number of these old patients are alive to-day whose heart failed badly two years ago. On further analysing the possible causes of this favourable result in these few cases one found that the arteries were not too rigid, the blood pressure was not too high, and the kidneys were functioning fairly well. To sum up, one can conclude that digitalis is most beneficial for a senile heart for many years, provided the "tubing" is not rotten, and the "filters" not choked.

(d) *The hypertensive group.*—Apart from these three main types of heart disease, there is another common type which may be named the hypertensive type. This type is often seen in middle aged men and women, with very high arterial blood pressure and urinary findings typical of interstitial nephritis. The later clinical features are partly due to heart failure and partly to uræmia. Professor Chauffard of Paris in his clinical lectures emphasised the utility of combining digitalis therapy along with eliminatory measures. Following his ideas, one gave to these cases large doses of the standardised tincture. With defective kidneys, one would expect small doses to be retained longer in the system and to do good. But the reverse was found to be the

case. Two of these cases with regular tachycardia of 140 and pulsus alternans consumed 3 ounces of tincture of digitalis a month for three months without any toxic effect on the heart, kidneys or bowels. This type of case is notorious for the sudden high fluctuations of blood pressure, and was carefully studied from this stand-point. Digitalis did not tend to raise the blood pressure; on the contrary a conspicuous fall was noted, possibly due to other measures.

(c) *Pregnancy with grave anæmia.*—This type looms large, and is responsible for many deaths. The patient is extremely pale, water-logged, weak, dyspnoic and almost pulseless. The picture towards the end is typically one of grave heart failure. Treatment is directed towards supporting the circulation and filling her up with as much "whole blood" as can be got from a suitable donor. Intravenous strophanthin, followed by digitalis orally, alters the picture of the case for a time, but unless rapid blood-regeneration can be stimulated and all blood-destruction effectively stopped, no permanent good can result. In hospital practice, malaria, ankylostomiasis and *B. coli* pyelitis have been found in many cases to have caused the anæmia; but in other cases no such cause has been discovered. The unfortunate feature of such cases is that when the patient has just rallied from heart failure, premature labour comes on and carries the patient off. This has repeatedly occurred. One lucky patient just survived abortion and eventually walked out of hospital. Two post-mortems were obtained and section of the heart muscle revealed an intense and diffuse fatty degeneration of the heart muscle. With such grave anæmias, digitalis is of conspicuous benefit for a time.

Digitalis Cumulation.—Digitalis cumulation is an event of which a great deal is written in books, but little is directly heard of from colleagues, and which is only rarely seen in this country by the general practitioner. Nevertheless, there is always a genuine fear in the minds of all. The fact remains that the potency of all samples of tincture of digitalis that has reached us is extremely feeble, and thus it is well nigh impossible to see a single case of digitalis cumulation when prescribed in 10 to 15 minim doses. The body can destroy 22 minims of the ideally potent tincture a day, and certainly more than 30 minims of the tincture as it reaches a hot country. Unless a patient regularly took one drachm for many weeks, he could not possibly accumulate sufficient to give rise to toxic effects.

The best results and greatest benefit to the patient can only be achieved by following MacKenzie's plan, which consists in starting the treatment with big doses, and keeping it up for 4 to 7 days, or until minor toxic effects are produced. It is worthy of note that the stage of optimum benefit to the patient is very close to the stage of minor intoxication. It behoves one, therefore, to strive in all cases to just reach the state of

minor toxic effects. These may be grouped thus:—

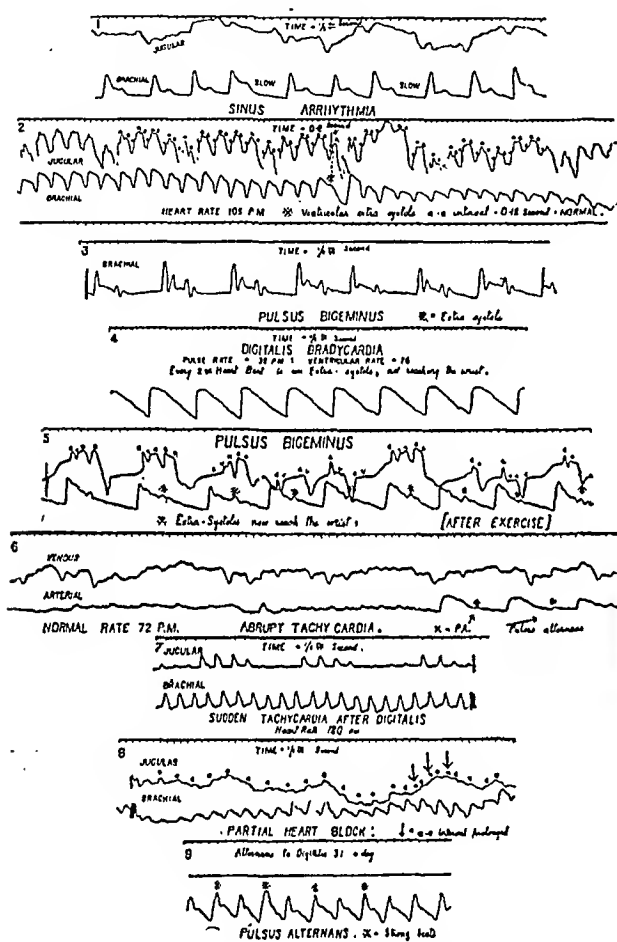
(1) *Heart.*—The most conspicuous effect is definite slowing to 80 or less. The slowing may be either quite regular and uniform (rare), or irregular, which is more common. The commonest type of irregularity is due to occasional premature beats, followed by a long pause. A rare type of irregularity has been caused by sinus arrhythmia, which is an expression of increase in vagal tone. There is quickening of the rate during inspiration and slowing during expiration. Another type of irregularity is known as coupling of the beats or "pulsus bigeminus." Directly this stage is reached, one must be cautious. Pulsus bigeminus means that every alternate beat is replaced regularly by a weak premature contraction, followed by a long pause. More dangerous than this stage is one which I have named "digitalis bradycardia." This stage was met with in 4 cases who did not obey instructions to stop digitalis. One of these patients had severe palpitation after excessive digitalis. On examining him the pulse was slow and regular at 38 per minute. On auscultation the ventricular rate was the same, 38 p.m., and no heart sounds were heard during these long pauses. Slight exercise, however, altered the picture. At the early part of each long pause was heard a faint single sound, caused by a weak premature beat which could not open the aortic valves. The pulse rate still remained 38 while the heart rate was exactly its double, 76 p.m. This rare and dangerous stage of bradycardia is easily mistaken for complete heart block, but is really an extreme condition where the premature contraction is too feeble to produce even a sound. A fourth rare condition resulting from digitalis cumulation is the occurrence of brief paroxysms of tachycardia, alternating with bradycardia. For instance, 10 slow regular beats at 50 p.m. are followed by 18 or 20 quick beats at 140 per minute. These are nothing but multiple extra-systoles, all grouped together. Another rare clinical condition after digitalis is partial heart block. In the 94 per cent. of our cases of heart failure with normal rhythm, digitalis induced a slowing of the whole heart, starting from the sino-auricular node. Electro-cardiographic tracings reveal a delayed conduction time from auricles to ventricles, but very rarely are auricular impulses held back by the auricular-ventricular bundle. Clinically one very rarely sees a digitalis slowing caused by partial heart block. Another type of slowing is quite regular and is associated with alternate strong and weak beats, called pulsus alternans. This is a digitalis effect and disappears when the drug is withheld. Complete heart block and auricular fibrillation have not been met with as caused by digitalis. While slowing of the heart is so well known, digitalis tachycardia is rarely seen. In three cases which were having big doses of digitalis, the heart rate had fallen to about 88. The next day regular tachycardia of 180 p.m. was seen, and the patient was in distress. Calomel and magnesium sulphate were given at once, because the patient had a coated tongue and constipation. Digitalis was stopped for a day. Tachycardia stopped suddenly, the heart rate was 95. More digitalis was added until the other typical toxic effects were produced. This sudden paroxysmal tachycardia has been regarded by some as an irritant effect of digitalis on the heart muscle. But this is not proved. A patient with digitalis tachycardia as a toxic symptom should also have nausea, vomiting, etc., and should not tolerate any further addition of digitalis. These three cases were not typical as regards the other features of toxicity. This tachycardia may therefore be due partly to excess of digitalis in the heart and partly to intestinal auto-intoxication.

(2) *Gastro-Intestinal Tract.*—Sudden and severe anorexia is almost the first symptom of digitalis intolerance. Following this are nausea and vomiting. Excessive purging is rare with digitalis, but specially frequent when too much strophanthus is taken.

(3) *Kidneys*.—Diminished secretion of urine is a common sign, and is evident when the daily output is being measured.

(4) *Weakness and Prostration*.—A patient who is improving with full doses also feels stronger and more fit. If the minor toxic effects are ignored, then he loses ground rapidly and feels extremely weak and helpless. The physician's dread of digitalis cumulation is so great that digitalis is stopped if any patient who has had it gets a little diarrhoea. Diarrhoea never occurs singly as a digitalis effect, but is always preceded by nausea, vomiting and the typical digitalis pulse.

CHART I.



Types of Digitalis Pulse.

1. Sinus arrhythmia, with quickening on inspiration and slowing on expiration.
2. * = Premature beat of ventricular origin, followed by a compensatory pause.
3. Pulsus bigeminus, or coupled beats: here an extra-systole replaces every alternate beat.
4. Digitalis bradycardia, where the alternate extra-systole does not reach the wrist. Pulse rate is only 38 p.m., but the ventricular rate is 76 p.m.
5. Same case as Fig. 4, but after exercise. Extra-systoles are more powerful and now reach the wrist. Pulse-rate = 76 p.m.
6. Rare type: normal rate is abruptly followed by tachycardia of 160 p.m., and finally by pulsus alternans.
* = alternate weak beat.
7. Rare type: sudden paroxysmal tachycardia of 180 after digitalis: called "digitalis tachycardia."
8. Partial heart block: ψ = a-c. interval longer than 0.2 second.
9. Pulsus alternans after digitalis.
* = strong beats.

This is a summary of the results obtained after a study of only 150 cases. The salient points may be summarised thus:—

Summary and Conclusions.

1. Over 150 cases of heart failure have been clinically studied, of which a large number were in imminent danger.
2. Of these only 6 per cent. of cases had auricular fibrillation, while 94 per cent. had normal rhythm starting at the sino-auricular node. On the contrary, over 66 per cent. of all cases of heart failure in Europe and America have auricular fibrillation.
3. Standardised tinctures obtained direct from Messrs. Parke Davis & Co. were used in almost all the cases, in preference to other preparations of digitalis.
4. The average quantity of tincture necessary to induce toxic effects varies in cold countries from 4 to 7 fluid drachms. In Calcutta the smallest dose required was 9 drachms, the highest was 29 drachms, and the average dose was well over 14 drachms. This result is partly due to loss of potency of tincture and partly to increased decomposition in the alimentary tract and liver.
5. To obtain prompt results in grave cases, the tincture has been used and ought to be used in doses of 2 to 3 drachms per day for 5 days.
6. Cases of failure with normal rhythm require nearly the same high dosage as cases with auricular fibrillation.
7. Cases of failure, with free aortic regurgitation, syphilitic myocarditis and a strongly positive Wassermann reaction, do not benefit permanently from digitalis.
8. Senile hearts, cases of marked hypertension and cases of grave anæmia with fatty degeneration of the myocardium respond exceedingly well to digitalis.
9. The stage of optimum benefit from digitalis usually merges into the stage of minor intoxication from cumulation of the drug.
10. With the tincture as obtained in this country it is extremely rare to get toxic effects from the use of tincture digitalis in B. P. doses of 15 minims thrice daily.
11. The toxic effects, such as slowing of the heart rate, nausea, vomiting and diminished diuresis often come on almost simultaneously, and after massive doses of 2 drachms a day have been taken for more than 7 days.
12. Apart from slowing, digitalis may rarely provoke a sudden paroxysmal tachycardia of 180 p.m., termed "digitalis tachycardia."

THE TREATMENT OF CHOLERA BY CRESOL AND ACID.

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IN the *Indian Medical Gazette* for August 1924 there was published a paper by the writer on the treatment of cholera by cresol.

As the result of experience, the treatment therein outlined had been modified in one respect before publication had actually occurred.

On theoretical grounds one would be inclined to agree with Rogers in his opinion that acidæmia plays a considerable part in the fatal issue in cholera. It is only reasonable to suppose that the acidity of the blood is considerably increased when, in the course of the disease, a large amount of alkaline fluid is poured into the bowel.

Rogers endeavoured to combat this by alkaline intravenous injections.

With the same end in view, for a time I gave alkaline water after the acute choleraic symptoms had subsided.

Though in my own hands this administration yielded very fair results, I was always somewhat apprehensive that, in the hands of inadequately trained personnel, the exhibition of alkalis might not always be unfraught with danger.

In two cases in out-gardens, in which the patients had at first appeared to do well, there was a suspicion that the set-back and subsequent fatal issue might have been due to the too early administration of alkali. It remained a suspicion, but, on this account, the administration of alkalis at any stage in the treatment was discontinued, without, apparently, any loss of efficiency.

At the same time it seemed increasingly evident that, at the beginning of cresol treatment, I had been inclined to stop administration of it too early. As I stated in the postscript to my former paper on the subject, cresol was then continued in diminishing doses till the third day.

During this stage in evolution my belief in the efficacy of dilute sulphuric acid as a prophylactic had been gradually strengthening, and I had often speculated as to how much of the good effects of Tomb's treatment was due to the acid that it contained.

The fear of increasing acidosis, however, had deterred me from putting the obvious application into practice. This fear must have been common to many, for even as a student one learns the susceptibility of the cholera vibrio to acid, and the use of this acid as a prophylactic is very common.

It was determined to try its effect, in association with cresol, in the treatment of cholera.

The following dosage was decided on, and instructions issued:—

1 to 3 years, cresol 1 m., acid sulph. aromat. 1 m., water 1 oz.

3 to 7 years, cresol 2 m., acid sulph. aromat. 2 m., water 2 ozs.

7 to 12 years, cresol 3 m., acid sulph. aromat. 3 m., water 3 ozs.

12 to 16 years, cresol 4 m., acid sulph. aromat. 4 m., water 4 ozs.

Adult, cresol 4 m., acid sulph. aromat. 5 m., water 4 ozs.

Acid sulph. dil. may be used instead of acid sulph. aromat., but is naturally lacking in the carminative properties of the latter.

I believe that dilute hydrochloric acid might prove equally useful.

It will be observed that the dose of acid is a small one, and graduated in view of the greater liability of children to acidosis.

The risk of this may possibly be exaggerated, as the flow in cholera is from the tissues to the interior of the bowel, but some absorption must occur or there would be no toxæmia.

The doses above given are administered as before; every quarter of an hour for the first eight doses, and every half hour for the next four doses. The acid is then omitted; and the cresol alone, in the same dose as before, continued at hourly intervals for another twelve doses, and thereafter at two-hourly intervals for another day. On the third day it is given at three-hourly intervals.

So far only nine cases have been treated by this method, all of them adults, but the results have been quite promising.

Eight of the cases were collapsed when first seen, and in three of these the collapse was absolute, no pulse being obtained even in the brachial artery.

There were two deaths in the series, there being only one death in the first seven cases. The severity of the cases suggests that this treatment is superior to that with cresol alone. This should be easily capable of proof or disproof during the coming hot weather.

This is my only excuse for bringing such a small series of cases to notice.

The doses should be freshly made up. After acid has been added to cresol solution some precipitation of globules gradually occurs, and might possibly impair the efficiency of the mixture.

I have considered the possibility of combining kaolin with this mixture, but have had no opportunity as yet. I would hazard the suggestion that some of the good effect of kaolin may be due to the fact that it stimulates a toxin-deadened intestinal musculature to drive it and the accompanying toxic fluid further down the bowel where absorption is less active.

In conclusion let me emphasise that any treatment of cholera should only be judged by the results given when the treatment has been in conscientious hands. Many cases pass through their most critical stage at night, and it is then that the treatment is most likely to be left in the hands of relatives who, however kindly, are tired themselves, and in addition have no idea of time. This, of course, only applies to cases treated in their villages or lines.

A NOTE ON THE OUTDOOR ORGANISATION OF THE ASANSOL MINES BOARD OF HEALTH.

By Dr. J. W. TOMB, O.B.E., M.D., D.P.H.,

Chief Medical Officer, Mines Board of Health, Asansol.

THE article by the editor in the *Indian Medical Gazette* for December 1924 on "Some Experiments for the Solution of the Rural Health Problem in India" makes it likely that an account of the outdoor organisation of the Asansol Mines Board of Health may not prove uninteresting at this juncture.

The Asansol Mines Board of Health, which is constituted under (Bengal) Act II of 1912, was brought into active existence by Government during the war in the early part of 1916 to prevent "the outbreak and spread of dangerous epidemic disease" in the Asansol Mining Settlement.

The Mining Settlement which is situated in the District of Burdwan comprises the greater part of the sub-division of Asansol, the most western sub-division of Bengal. It lies 110 to 140 miles west of Calcutta, on the main line of the E. I. Railway from Calcutta to Delhi, which runs through the Settlement in its longer axis.

Within the Settlement are included 200 collieries, 490 villages and the two municipalities of Asansol (population 21,727) and Raniganj (population 14,536), the total population of the Settlement, according to the census of 1921, being 329,353.

The chief epidemic diseases in the Settlement are cholera and small-pox, plague being unknown in epidemic form.

The unit of administration adopted in the Settlement is the circle of the Sanitary Assistant which is about 36 sq. miles in area. Experience in the Mining Settlement has, moreover shewn that the largest area which any rural Sanitary Assistant can effectively deal with does not exceed 50 sq. miles. The number of rural Sanitary Assistants employed by the Mines Board of Health is 13.

The duties of each Sanitary Assistant are:—

1. To collect the vital statistics of his circle from the village chowkidars at the weekly chowkidari parade held at the police thana.

2. To verify these occurrences during the week.

3. To submit a weekly report on the sanitary condition of the villages visited and inspected by him while verifying the returns of births and deaths received from the chowkidars at the police thana or while on other duty.

4. To receive reports of any outbreak of cholera, small-pox or plague and to take immediate steps for its suppression.

5. To vaccinate during the first year of life all children born in his circle and all other persons found unvaccinated or requiring re-vaccination.

6. To give lectures on elementary hygiene in the primary schools of his circle.

7. To make certain that the burning ghats in his circle are kept in proper order by the staff of *doms* maintained by the Board for that purpose.

We may now consider in detail how these duties are carried out.

All members of the outdoor staff of the Board are called upon to maintain bicycles, for the purchase of which they are lent money, free of interest, by the Board and receive monthly bicycle allowances of Rs. 10 each.

Each Sanitary Assistant, as noted above, attends the weekly chowkidari parade at the police thana of his circle, and there notes down the births and deaths of his circle as reported by the village chowkidars.

During the week he verifies these occurrences, ascertaining as far as possible the real cause of death, which, in the majority of cases, is attributed by the chowkidar to "fever." The true cause of death, however, on enquiry from the relatives or others can be generally ascertained, as malaria, pneumonia, cholera, small-pox, snake-bite, childbirth, accidents, etc., are all well known to intelligent villagers.

The Sanitary Assistant also makes enquiry in each village regarding any births and deaths that may not have been reported by the chowkidar. Experience has proved that practically all deaths are reported in the Mining Settlement—as can be verified by the numbers of bodies disposed of at the burning ghats. About 2 per cent. of births, however, remain unreported.

A permanent register of the corrected returns of births and deaths is kept by the Sanitary Assistant in his office. A copy of this is submitted weekly to the office of the Mines Board for record, and another copy is sent to the police thana for forwarding to the office of the Civil Surgeon of the district.

The Sanitary Assistant also submits weekly to the Chief Sanitary Officer, on a form provided for the purpose, a report on the sanitary condition of the villages visited by him during the week. The headings of the form are as follows:—

"Name of village. Date of visit. Object of visit. Whether or not any epidemic was found. Number vaccinated. Water supply (whether satisfactory or not). Condition of village burning ghat. General sanitary condition of village."

Each Sanitary Assistant, at the end of each year, submits to the Chief Sanitary Officer a list of the villages in his circle in the most urgent need of wells. This list after due enquiry and verification is sent in to the Asansol Local Board which frames its yearly programme of well-construction in the Mining Settlement on the recommendations of the Mines Board staff. The Vice-Chairman of the Mines Board is *ex-officio*

Chairman of the Local Board, and the Chief Sanitary Officer is a nominated member.

For the immediate reporting of cases of cholera and small-pox the chowkidars of each circle are provided with coloured postcards. On the red cards is printed the word for cholera in Bengali and on the green the word for small-pox, the name of the village as well as the name of the chowkidar being written in, in ink on each card, by the Sanitary Assistant at the time of distribution. This system of notification of epidemic disease by coloured postcards, which was first introduced by the writer in the Mining Settlement in the year 1917, has now been adopted in several areas in Bihar and Orissa and seems suitable for general adoption throughout India.

On receiving information of any case of cholera or small-pox in the village, the chowkidar at once starts off on foot to the office of the Sanitary Assistant of his circle, which in the Mining Settlement is in no instance more than 6 miles away. For each case thus notified the chowkidar receives a reward of one rupee. The amount of money required annually for this purpose is quite small as, when once a single case of epidemic disease is notified in any village, the Board's staff keep in constant touch with the village until the epidemic is suppressed. On reaching the office of the Sanitary Assistant, if the Assistant be present the chowkidar notifies him verbally of the outbreak, but if as is more often the case, the Assistant is out on his duties, he drops the epidemic notification card into a small glass-fronted card box provided for the purpose outside the Sanitary Assistant's office door. The object of having a glass front to the box is to make certain that the Sanitary Assistant on his arrival back at his office will not fail to notice that an epidemic notification card has been placed in the box during his absence. The box is also located at such a height as to be out of the reach of children.

On receiving the epidemic notification card the Sanitary Assistant immediately proceeds by bicycle to the village named thereon and seeks out the chowkidar whose name was written on the card, by whom he is at once directed to the infected house. In case of small-pox no attempt is made at the isolation of the patient, as this is impracticable in rural health work in India, reliance being placed wholly on wholesale vaccination and re-vaccination, a procedure which experience has proved to be eminently satisfactory. It is also the duty of the Sanitary Assistant to report such cases at once to the Sanitary Inspector of his circle and to the office of the Mines Board of Health, on the form provided for the purpose, which in addition to "Name," "Age," "Sex," "Caste," has the following headings:—
 "Date of Onset of Fever; Date of Outbreak of Eruption; Date of Notification of Case by Chowkidar; Date of Previous Protection (if any)."

The date of outbreak of eruption, as pointed out by me elsewhere (*Lancet*, 1923, p. 485), furnishes a ready method of distinguishing small-pox from chicken-pox, since in chicken-pox the eruption always appears within 24 hours of the onset of fever (sometimes even appearing before the fever), whereas in small-pox there is always a well defined interval of at least 48 hours.

When the case is one of cholera, if the patient be not already under medical treatment, he is given eight doses of the essential oils' cholera mixture (vide *Indian Medical Gazette*, June 1923 and May 1924), by the Sanitary Assistant at half-hourly intervals. One prophylactic dose of this mixture is also administered daily to each inmate of the infected house until the patient is clinically recovered, the member or members of the family actually engaged in nursing the patient receiving two doses daily—night and morning. As recorded by me in the *Indian Medical Gazette* of May 1924, since this procedure was adopted three years ago no second case of cholera has occurred in any house in the Mining Settlement. Enquiry is then made as to the probable cause of the outbreak whether sporadic, epidemic or imported, and whether or not any tank in the village has been contaminated by washing the soiled clothes of the patient in it. Where the latter has occurred the tank is immediately sterilised and kept continuously sterilised with chloride of lime and also placed under guards at the expense of the Board to prevent the further use of the water until the epidemic is over. Sometimes where the tank is closely surrounded by dwelling houses and there is great likelihood that the water may be used in spite of the precautions enumerated above, the tank is also oiled with kerosene to render the water undrinkable. During the epidemic cholera season of the year (March to June) suitable tanks, with the consent of the owners, are reserved in each village by the Board for drinking purposes only and others for bathing purposes only. Formerly as a prophylactic measure it was customary to leave some coal-tar disinfectant, such as izal or cyllin, for the inmates of the infected houses to disinfect their hands with before eating; but this has been found unnecessary since the introduction of the essential oils cholera prophylactic.

As in the case of small-pox, the Sanitary Assistant immediately reports each case of cholera both to the Sanitary Inspector of his circle and to the office of the Mines Board of Health on a special form, which in the case of cholera includes the following headings:—

"Date of Notification of Case by Chowkidar; Date and Hour of Attack; Date and Hour of Arrival of Sanitary Assistant; Whether Case was found Collapsed or not; Treatment; Result."

With regard to vaccination, each Sanitary Assistant is provided with a bound register;

which the births of all children in his circle are recorded week by week and village by village. This register is regularly inspected by the Sanitary Inspector of the circle to see that it is kept posted up to date, and it is the duty of the Sanitary Assistant successfully to vaccinate each child whose name is there entered before it is one year old, unless it has in the meantime died or left the Mining Settlement. As there is a prejudice in Bengal against the vaccination of infants under six months old, no attempt is made in the Mining Settlement to vaccinate them under that age. This register incidentally affords a valuable check on the accuracy of the reports of vital occurrences by the village chowkidars, as it is found from it that not more than 2 per cent. of the surviving children in any one year have not had their births notified and recorded. Every effort is made to re-vaccinate all young adults, especially girls before *purdah-nashin* age; and when any case of small-pox (or chicken-pox) occurs the opportunity is immediately seized to carry out wholesale re-vaccination, as it has been found that the villagers at such times willingly submit to this procedure. By these means small-pox has been practically abolished from the Mining Settlement, the death rate from the disease during the year 1922 being nil. The Sanitary Assistant also gives weekly lectures in Bengali in the primary schools of his circle on elementary hygiene; and a primer in simple language for that purpose has been compiled by me entitled "*Saral Sastatattwa*," dealing with the following subjects:—

- (1) The Importance of a Pure Drinking Water Supply; (2) Cholera; (3) Typhoid Fever; (4) Dysentery; (5) Malaria; (6) The Importance of Quinine in the Prevention and Cure of Malaria; (7) Small-pox; (8) Plague; (9) Consumption; (10) Flies; (11) Hookworm Disease."

This primer which is printed at the Board's expense is distributed free to all scholars in the primary schools of the Settlement. For delivering these lectures each Sanitary Assistant receives an allowance of four annas per lecture, and the scholars are periodically examined in the subject-matter of the primer by the Sanitary Inspector of the circle, and suitable book prizes are awarded annually to the boy (or girl) in each school shewing the best acquaintance with the subject. Each Sanitary Assistant is provided with a staff of *doms* to keep the burning ghats in his circle in sanitary order, and it is his duty to supervise their work and to see that they carry it out efficiently. Under the Act the Board is empowered to "recognise" and control all burning ghats in the Mining Settlement. On the establishment of the Board in 1916 the most suitable of the existing sites commonly used as burning ghats in the Settlement were selected after due enquiry for "recognition" and the remainder closed. Burning ghats in the Settlement, therefore, consist

merely of suitable pieces of open land in the vicinity of tanks or streams, water being a ceremonial necessity in Hindu cremation. The area of the burning ghat is demarcated with pillars; and due care is taken, in the case of those ghats which border on streams or rivers, that sufficient space is left between high-water level and the ghat for safety, no one being permitted to cremate or bury a dead body outside the limits of the ghat. It is the duty of the *dom* in charge to see that this order is carried out, and that all bodies are thoroughly reduced to ashes or effectively buried. Before the establishment of the Board, cholera was frequently spread in the Settlement by burying the corpses of those who had died of cholera in the sand of river-beds or by throwing uncremated or partly cremated corpses into the stream, but such acts are now things of the past.

In charge of the Sanitary Assistants are six fully qualified Sanitary Inspectors, each Inspector having as a rule two Sanitary Assistants under him. The duties of each Sanitary Inspector consist in the supervision of the work of his Sanitary Assistants and in the sanitary inspection of the collieries in his circle. Collieries are bound by law to give immediate notice to the Board (and to the Sanitary Inspector of the circle) of any case or suspected cases of cholera, small-pox or plague. This notice is sent to the Sanitary Inspector by special messenger and to the office of the Mines Board by post on a special form provided for the purpose.

In cases of epidemic disease in collieries, similar steps are taken by the Sanitary Inspector to those taken by the Sanitary Assistant in villages. The Sanitary Inspector, however, has the assistance of the medical staff in collieries, but where the colliery is small and the staff insufficient or where the colliery is remote from the headquarters of the Sanitary Inspector, the Sanitary Assistant is also requisitioned to see that everything necessary to prevent the spread of the disease is carried out. The Sanitary Inspectors also give systematic lectures, illustrated with magic lantern slides, on public health in the villages of the Settlement during the cold weather and in epidemic times. The Board also employs an anti-malarial staff of six promoted Sanitary Assistants who have been specially trained in the necessary entomology, etc. Throughout the malarious season of the year (July to October) when any outbreak of "fever" is reported from any village by the chowkidar or by the Sanitary Assistant, the anti-malarial investigator is at once sent to that village to ascertain the splenic index, and to examine all the tanks and water courses in and around the village with a view to discovering which of them are infested with malaria-carrying anopheline larvæ. On the investigator's report being received by the Chief Sanitary Officer, a letter is written to the owners of the infested tanks acquainting them of the facts and requesting them to have the tanks cleared of weeds.

This is occasionally carried out by the owners if sufficiently enlightened or wealthy, but in most cases is done by the Board, and where done the epidemic as a rule quickly subsides. A striking instance of this occurred in Bansra village near Raniganj where, in the month of August 1922, the Sanitary Assistant reported that on his weekly inspection that he had found great numbers of the inhabitants confined to bed with "fever." The anti-malarial investigator was accordingly ordered to report at once on the splenic index of the village and on the infestation of the village tanks. On investigation he found that the splenic index was 20 per cent. and that of many tanks in and around the village, one tank only was infested with larvæ of a malaria-carrying species of mosquito (*A. fuliginosus*). At the writer's suggestion this tank was cleansed of weeds by the owners of the village (Messrs. The Bansra Coal Co., Ltd.) at an approximate cost of Rs. 25, and within two months of the cleansing of the tank and without any other anti-malarial measures having been taken, the splenic index of the village had fallen to 9.6 per cent., and at the end of December to 0. This case furnishes a good example of the benefits that can be secured by the scientific direction of effort in public health administration. The malaria-carrying species of mosquito generally found in the Mining Settlement are *A. fuliginosus*, *A. culicifacies* and *A. sinensis*, their relative frequency being in the order named.

A staff of three midwives is also maintained by the Board to render gratuitous assistance to the married women of the Settlement before, during, and after confinement. The three midwives have their resident headquarters on collieries in different areas of the Settlement and their chief work lies amongst the colliery population whose houses they visit daily, giving ante- and post-natal advice and assistance to women requiring it and simple lectures in domestic hygiene and cleanliness to others. They also act as vaccinators of *purdah-nashin* women and girls during the vaccination season and whenever small-pox is epidemic.

For the medical inspection of school children a qualified Sub-Assistant Surgeon is employed. When a child at school is found on examination to be suffering from any defect, a written report to that effect is sent home with the child, suggestions being made at the same time for the remedy; and it is satisfactory to note that in a considerable proportion of cases, where the parents are literate, these suggestions are carried out. The percentage of defect found amongst the school children in the Mining Settlement is about 40 per cent.

The organisation of the Mines Board of Health, while essentially rural, has been elaborated to meet the special requirements of the Mining Settlement. For ordinary district public health work a considerably less numerous staff would

suffice; and I give below the outlines of an organisation suitable for such work, originally published by me elsewhere, which can be maintained on a sum representing less than one anna per head of the population per annum.

Presuming that the average district in Bengal is 3,000 square miles in area, which is an *over-estimate*, there would be required according to the scale laid down above:—

| | Rs. |
|--|--------------|
| 1 District Health Officer at Rs. 400 p.m. plus Rs. 150 Travelling Allowance .. | 6,600 |
| 15 Sanitary Inspectors at Rs. 100 p.m. plus Rs. 30 Travelling Allowance .. | 23,400 |
| 60 Sanitary Assistants at Rs. 20 p.m. plus Rs. 15 Travelling Allowance .. | 25,200 |
| 1 Head Clerk and Accountant at Rs. 75 p.m. .. | 900 |
| 2 Assistant Clerks at Rs. 35 p.m. .. | 840 |
| 1 Peon at Rs. 15 p.m. .. | 180 |
| Stationery, Forms, etc. .. | 1,000 |
| Rent of Offices for Sanitary Inspectors and Sanitary Assistants .. | 4,600 |
| Medicines, Essential Oils Cholera Prophylactic, Chloride of Lime, etc. .. | 3,000 |
| Rewards to Chowkidars for notification of Cholera and Small-pox .. | 500 |
| | <hr/> 66,220 |

Taking the average population of a district in Bengal as 1,250,000—which is an *under-estimate*—a rate equivalent to a contribution of one anna per head per annum would provide no less a sum than Rs. 78,000, an amount which as we have seen above, would be more than sufficient to provide a complete public health organisation for the district.

As an illustration of the value of the work which can be accomplished by such an organisation, I give below a table, compiled from the weekly returns of vital statistics in the *Calcutta Gazette* for the year 1923, shewing the death rates per thousand in the Asansol Mining Settlement as compared with those in Calcutta, Howrah, Dacca and Maniktolla municipalities:—

| | Calcutta. | Howrah. | Dacca. | Maniktolla. | Asansol Mining Settlement. |
|----------------------------|-----------|---------|--------|-------------|----------------------------|
| Cholera .. | 1.00 | 1.19 | 1.32 | 0.99 | 0.56 |
| Small-pox .. | 0.17 | 0.09 | 0.02 | 0.28 | 0.015 |
| "Fever" .. | 4.09 | 8.22 | 11.21 | 5.46 | 2.10 |
| Diarrhoea and Dysentery .. | 2.24 | 4.44 | 2.54 | 3.69 | 0.83 |
| Respiratory diseases .. | 8.91 | 6.47 | 2.98 | 10.24 | 3.75 |
| TOTAL .. | 28.40 | 28.64 | 28.33 | 31.63 | 17.97 |

It should be remembered that the Asansol Mining Settlement was once such a hot-bed of disease as to necessitate for its sanitation the establishment of a special Board of Health, the population being annually decimated by a regular succession of epidemic diseases—cholera, small-pox and malaria, in the order named. All that has now been changed, and the Settlement is

probably, at present, the most salubrious area of its size in the plains of India with a death rate which compares favourably with that of many countries in Europe.

IS *TRICHOMONAS HOMINIS* PATHOGENIC?

By Capt. P. GANGULI, B.A., D.T.M. (Bengal),

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EVER since the discovery of *Trichomonas vaginalis* by Donne in 1837 in vaginal mucus, and of *Trichomonas hominis* by Davaine in 1854 in enteric and cholera stools, opinions have varied as to the pathogenicity of this protozoon. Schaudin was of opinion that *Trichomonas* becomes an amoeba, and this view was corroborated by Gauducheau in 1912, who thought that it was parasitic in the tissues in the amoebic stage, saprophytic in the lumen of the bowel, and a free flagellate in the free living state in stools. It was Gauducheau who found out that *Læschia undulans* of Castellani was really allied to this species. There is no doubt that *Læschia undulans* is nothing but a dying *Trichomonas* in its preliminary stage before rounding up. When a *Trichomonas* loses its active motility, it emits a finger-like protrusion in front and passes it on one side towards the back. This protrusion is then withdrawn near its back and is again emitted in the front. The figure of *Læschia undulans*, given on p. 319 of Castellani and Chalmers' "Manual of Tropical Medicine," shows an undulating membrane, and there is no doubt that this was a picture of a dying *Trichomonas*. Sometimes this protrusion assumes a club-shaped extremity.

There is a general opinion amongst protozoologists such as Dobell, O'Connor, Knowles and others that *Trichomonas* is not pathogenic. Dobell gives three reasons in favour of his assertion:—

(1) He does not consider that these flagellates are more common in cases of diarrhoea than in healthy persons.

(2) These flagellates do not attack the tissues of the host.

(3) No methods of treatment have yet been discovered by which this infestation is removed.

As regards the first point of Dobell, I would like to point out that out of 43 cases in which *Trichomonas* was found in human stools in Eastern Bengal, no less than 36 were suffering from either diarrhoea or dysentery. Stools of three such dysentery cases were "plated" but no colony of dysentery bacilli was discovered. Seven cases with normal formed stools showed motile *Trichomonas*. I consider them carriers in analogy with *Entamoeba histolytica* carriers. Just as some persons may harbour *E. histolytica* without showing any signs of dysentery, so *Trichomonas* may be found in persons passing healthy stools.

Coming to the second point of Dobell, that these flagellates do not attack the tissues of the host, I would like to point out that in six of my cases *Trichomonas* was found to contain red blood cells. These were all cases of diarrhoea, in the stools of which the red blood cells were very scarce, although the occult blood test was positive in all the cases. On the other hand, no red blood cells were found within any *Trichomonas* found in dysenteric stools containing numerous red blood cells. Knowles points out that the presence of red blood cells in *Trichomonas* is no proof of its pathogenicity. But no other non-pathogenic intestinal flagellate has been found to have ingested the red blood cells. Even *Giardia intestinalis*, an admittedly pathogenic flagellate, has not been seen to ingest red blood cells. Again the amoeboid character does not always impart the power of ingesting the red blood cells, as proved by the fact that none of the non-pathogenic entamoebæ found in the human stools ingest them, although they have got to wade through the red blood cells when found in dysenteric stools. There is not a single instance of a non-pathogenic amoeba, flagellate or ciliate that I know of which ingests red blood cells. *Balan-tidium coli*, a pathogenic ciliate, ingests red blood cells.

Besides ingestion of red blood cells, there is another point in support of its pathogenicity. Wenyon's discovery of this flagellate set deeply in sections of the mucosa of the human intestine disproves Dobell's second point. Wenyon himself believes that it must have some connection with pathogenicity.

Dobell's third point is the intractability of the infestation to any medication. *Trichomonas* infestation can be easily removed by exhibition of oleum terebinthinæ. All my cases readily yielded to big doses of oil of turpentine given with castor oil emulsion. The patients showing *E. histolytica* in their stools in addition to *Trichomonas* required emetine as well.

There is another interesting point in this connection. In two cases passing dysenteric stools, both *E. histolytica* and *Trichomonas* were found. The pH of both the stools was 6.8. In nearly all the cases the reaction of the stools showing *Trichomonas* was distinctly alkaline; but in these two cases, although the reactions of the stools were acid, the flagellates were found to be as active as ever.

TRICHOMONAS INFECTION IN THE URINE.

By Assistant Surgeon S. K. GHOSH DASTIDAR,
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Trichomonas hominis is a well-known intestinal flagellate protozoal parasite of the intestine; and several writers have described infection of the vagina with *Trichomonas vaginalis*. *Trichomonas* infection of the urethra in the male,

however has not been previously described as far as I am aware. In routine examination of some thousand specimens of urine from both sexes, I had never encountered this parasite until recently, but have lately encountered urinary infection in four individuals, three of them males. These cases were as follows:—

Case 1.—B. C. S., Hindu male, aged 62 years. On March 16th, 1924, the urine gave a specific gravity of 1010; reaction slightly acid; a trace of albumin present; no sugar. Microscopic examination of the deposit shewed a few pus cells and numerous and actively motile *Trichomonas*. On the 21st April, 1924, the urine was neutral in reaction; neither albumin nor sugar was present, and neither pus cells nor *Trichomonas* could be found.

Case 2.—S. B., Mahomedan male, aged 50 years. On the 24th May 1924, the urine had a specific gravity of 1005 and an acid reaction; shewed no albumin or sugar; and on microscopic examination a few pus cells and *Trichomonas*. On the 13th July 1924 the reaction was neutral; and neither pus cells nor *Trichomonas* were found.

Case 3.—N. M., Hindu female, aged 19 years. On the 8th November 1924, the urine had a specific gravity of 1010 and acid reaction; shewed no albumin or sugar, but many *Trichomonas* on microscopic examination of the deposit.

Case 4.—S. C., Hindu male, aged 40 years. On the 20th January 1925, the urine had a specific gravity of 1008 and acid reaction; shewed no sugar or albumin; but on microscopic examination some pus cells and numerous *Trichomonas*.

All the samples of urine were collected in clean glass urinals by myself, so no question of faecal contamination can arise. It is interesting to note that in two instances where a second examination was carried out, the infection had spontaneously cleared up within a short time, without any treatment, and that the pus cells present at the first examination when *Trichomonas* was present, were absent at the second examination when it was absent. It would appear that *Trichomonas* may cause a mild urethritis, attended with smarting and burning on micturition, or the discharge of pus per urethram, but that this urethritis cures itself on the disappearance of the *Trichomonas*.

ON THE TECHNIQUE AND SIGNIFICANCE OF THE ROSINDOLE REACTION, APPLIED TO URINE.

By A. NEAVE KINGSBURY, M.B., B.S. (Lond.),
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and

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THE derivatives of tryptophane, which are known to be formed by putrefactive bacteria in the intestinal canal, are indole-propionic acid, indole-acetic acid, indole and skatole. Small quantities of indole are absorbed and undergo

further oxidation to indoxyl, which is excreted in the urine combined with sulphuric acid (indican) and glycuronic acid. The formation of indican is thought to be one of the many functions of the liver, and the quantity present in the urine is regarded as an index of the degree of intestinal stasis. It is probable that other derivatives are also absorbed from the alimentary canal. Putrid purulent conditions are sometimes accompanied by an increase in urinary indican, and this observation has been cited as evidence that endogenous formation may occur.

The purpose of the present paper is to point out that products of tryptophane, other than indican, are frequently present in urine and that variation in the excretion of these products appears to have some correlation with certain pathological conditions.

Since indole production has been regarded as a determinative characteristic in bacteriology, considerable research has been carried out on the indoles and their colour reactions. Ehrlich's rosindole test has been found delicate, but is also given by tryptophane and many of its derivatives, though confusion is unlikely to occur with skatole as a blue violet tint is produced instead of the usual rose colour.

It has been suggested that the rosindole reaction could be rendered more specific by its application to a distillate, as tryptophane and indole-acetic acid are non-volatile in steam, while indole and skatole are known to be readily volatile. Working along these lines Goré¹ devised the ingenious cotton wool plug (C. W. P.) test for indole, which was shown by Malone and Goré² to give positive results with an indole dilution of one part in two million.

In a recent communication to the Medical Research Section of the Indian Science Congress, Goré³ suggested that the application of the cotton wool plug test to urine would serve to indicate the presence of indican, but based this conclusion on the parallel results obtained with his test and the Obermeyer test for indican on ten specimens only. For the convenience of readers Goré's technique of the cotton wool plug test for urine is given below:—

"Put 2 c.c. of urine into a small test tube (5 ins. by $\frac{3}{4}$ in.) and fit it with a plug made of white absorbent cotton wool. Remove the plug, moisten its under-surface with a drop or two, first of potassium persulphate solution (potassium persulphate 1 grm.; distilled water 100 c.c.) and then of p. dimethyl-amino-benzaldehyde solution (p. dimethyl-amino-benzaldehyde 1 grm.; absolute alcohol 95 c.c.; concentrated hydrochloric acid 20 c.c.), and replace it. Bring the urine to the boil by intermittent heating in a low flame, and if the urine contains indican, half a minute or a minute's further such boiling imparts a pink colour to the moistened under-surface of the plug. In the case of a negative result, i.e., absence of indican, no pink colour is seen on the cotton wool."

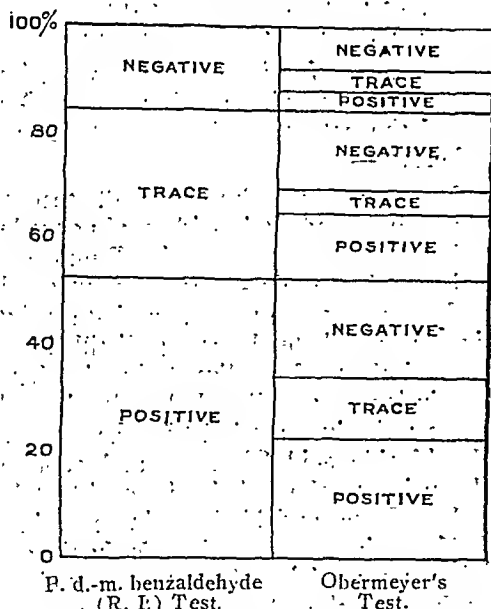
If Goré's test can be applied for urinary indican, either indican must be volatile and capable of giving the rosindole reaction, or variations in the excretion of indican must be accompanied by similar variations in the excretion of a volatile rosindole-positive substance. That indican is non-volatile was demonstrated by the writers in the following experiment:—

400 c.cms. of pooled urine which gave positive results with both the cotton wool plug and the Obermeyer tests were slowly distilled until 200 c.cms. were obtained. Both distillate and residue were made up to the original volume with distilled water so that the volatile and non-volatile constituents respectively were in the same concentration as in the original urine. The diluted distillate gave the cotton wool plug reaction to the same degree as the original urine but was negative to the Obermeyer test, while the diluted residue did not give the cotton wool plug reaction but the Obermeyer test was positive as in the original urine. The cotton wool plug reaction, therefore, cannot be given by indican.

In order to determine if the excretion of a volatile rosindole-positive substance was paralleled by the excretion of indican we have carried out a series of upwards of 250 rosindole tests by the modified technique described below which will be referred to as the R. I. test. Each urine was also tested with Obermeyer's reagent for indican. The specimens were obtained from Chinese and Tamil patients in the admission ward of the District Hospital, Kuala Lumpur, and we desire to acknowledge our indebtedness to Dr. E. A. O. Travers for the clinical material.

A graphical comparison between the results of the two tests is shown in Chart I, from which it is seen that no relationship exists between the excretion of indican and the volatile rosindole positive substance.

CHART I.



A graphical comparison of the results from the R. I. and Obermeyer Tests.

What, then, is the substance present in a large percentage of urines which gives a positive R. I. test? To isolate it, a large quantity of pooled urine was distilled and the distillate thoroughly extracted with neutral ether, which was allowed to evaporate at room temperature, leaving a fine film at the bottom of the flask. The extracted distillate no longer gave a positive R. I. reaction, and the ether-soluble residue was found to contain indole though it is possible that traces of other volatile, ether-soluble, rosindole-positive substances were also present.

A simplified technique for the urinary rosindole test.

In carrying out our series the cotton wool plug was found to be inconvenient, and it was early superseded by a diaphragm of filter paper over the mouth of the test tube, held in position by an india-rubber ring. Three drops of the persulphate solution were placed on the diaphragm followed by three drops of the p. dimethyl-amino-benzaldehyde solution, delivered by a small pipette. This modification has the advantage that the result can be read directly by viewing the upper surface of the diaphragm. Intermitent boiling over an open flame was tedious and liable to give varying results. We therefore employed a water-bath and all tubes were placed in boiling water for seven minutes before reading. The rose colour tends to fade after removal of the tubes from the bath, so that readings should be made immediately after removal.

We found that the test could be rendered quantitative as the gradations of the rose colour obtained approximate very nearly to the shades produced by dipping filter papers in very weak solutions of neutral red. The neutral red papers are standardised by matching the tints obtained by applying the test to known indol solutions, and are then compared with the colours given by the urine under test. The disadvantage of this method is the tendency of neutral red to fade, which necessitates re-standardisation from time to time.

Correlation between the results of the rosindole test and clinical diagnosis.

The readings of the R. I. and indican tests in various diseases are shown in Table I, from which all "trace" readings have been omitted. The results indicate possible clinical applications of the R. I. test, though the number of cases in each group is too small for the drawing of any definite conclusion.

In the respiratory diseases (25 cases)—pneumonia, influenza and tuberculosis—there is a slight increase in the percentage of R. I.-positive cases, and it is noteworthy that all the cases of tuberculosis, including seven pulmonary and two bone infections, gave positive R. I. tests, while only in three cases was a positive indican result obtained.

The nephritic cases (16) included sub-acute nephritis and two cases of chronic interstitial

nephritis. The results in this group are of interest because the percentage of R. I.-positive cases is considerably decreased, but the indican results show little variation from the average over the series. Possibly the nephritic kidney is unable to excrete the R. I.-positive substance as readily as the normal kidney.

The liver insufficiency cases (7)—cirrhosis and abscess—show a largely increased percentage

(1) Whether sodium iodide orally was beneficial in cases of goitre.

(2) Whether iodine is essential for the good functioning of the thyroid gland.

(3) Whether the oral administration of sodium iodide could prevent the disease.

He suggested that it might be advisable if the drug was administered intravenously, pointing out further that no possible harm could be done

TABLE I.

Showing the results of the R. I. and Obermeyer Tests in various Diseases.

| | All Cases. | Malaria. | Respiratory Diseases. | Nephritis. | Alimentary Diseases (Dysentery, "Indigestion" and Constipation). | Liver Diseases (Cirrhosis and Abscess). | Sepsis (Ulcers, Abscess, Cellulitis, etc.). | Syphilis. |
|-------------------------------|------------|----------|-----------------------|------------|--|---|---|-----------|
| No. of Cases | 265 | 98 | 25 | 16 | 21 | 7 | 16 | 19 |
| Indole + (R. I. Test) | 52% | 49% | 56% | 31% | 67% | 71% | 50% | 58% |
| Indole - (R. I. Test) | 16% | 18% | 12% | 38% | 0% | 0% | 6% | 16% |
| Indican + (Obermeyer Test) .. | 38% | 36% | 32% | 44% | 38% | 29% | 44% | 47% |
| Indican - (Obermeyer Test) .. | 42% | 43% | 40% | 44% | 24% | 43% | 38% | 42% |

of positive cases while the indican positive percentage is slightly decreased; a result which is not at variance with the theory that the formation of indican from indole occurs in the liver.

The results obtained in other diseases require little comment.

Summary.

A technique for the application of the rosindole test to urine is described.

A positive result does not indicate the presence of indican in the urine.

The percentage of positive cases is decreased in nephritic cases and increased in liver insufficiency cases.

REFERENCES.

¹ Goré, S. N. *Indian Jl. Med. Research*, 1920, VIII, 3, p. 505.

² Malone, R. H. and Goré, S. N. *Ibid.*, p. 490.

³ Goré, S. N. *Indian Med. Gazette*, 1924, LIX, p. 393.

INTRAVENOUS INJECTIONS OF SODIUM IODIDE IN THE TREATMENT OF GOITRE.

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and

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The junior writer first broached the subject of intravenous injections of sodium iodide for the treatment of goitre with a view to testing:—

if no benefit was obtained, the drug being alkaline and non-poisonous. Accordingly we agreed to test the treatment, for which purpose the senior writer visited one of the villages close to Falam, and selected two cases (Nos. 4 and 5) of goitre, about the size of an orange each. On his return he found two other cases had applied for treatment for goitre (Nos. 2 and 3); these were old-standing cases and very much larger than Nos. 4 and 5.

Of the two sets, Nos. 3 and 4 were selected for intravenous treatment for the following reasons:—

Case 3.—The woman was normally developed and the goitre was not circumscribed and hard, whereas in case 2 the woman was partially a cretin and mentally affected to a certain degree.

Case 4.—The boy being older than case 5, we expected that the veins would be easier to deal with. Otherwise there was not very much to choose between the two goitres.

All the cases will be discussed in turn, and it is hoped that in a short time we will be able to add a long list to this short one. Our reasons for publishing our results so early are two-fold:—

(1) To enable other workers to take up the experiments.

(2) To try and get the drug in as pure a form as possible, also in a more portable form than the powder at present in use.

The drug has been administered intravenously without any previous preparation, though the

patients are treated in the morning on an empty stomach.

For the first dose 10 grs. was used and administered to case 3. She had a slight rigor with a temperature of 100.4° F. It was then decided to lessen the dose. Five to 6 grs. intravenously is tolerated well without any reaction: a solution of 1 gr. to 1 c.c. of distilled water is used. In fact a few cases under treatment now attend hospital as out-patients, attending every fourth day for injection. They return to their villages a few hours after receiving the injections, without any ill-effects. During the intervening days they are given the drug by the mouth (2 grs. three times a day). This they declare they take regularly. The result of these cases will be published later.

The reasons for adopting this measure of treating these patients as out-patients are that:—

(1) Chins will not come into hospital unless they are dieted.

(2) They cannot be away long from their fields and homes for such a trivial thing (to them) as a goitre.

(3) So far they are convinced that nothing can be done to cure goitre.

(4) On the whole they do not suffer much inconvenience from the disease.

(5) There are a few among them who suffer mentally, but the cause is not ascribed to goitre, by the Chin.

(6) They usually apply for treatment only when the goitre is painful, or when there are symptoms due to pressure.

(a) When the goitre is painful they hope to get relief, or the goitre may suppurate.

(b) When very large, they have been sent back without relief. For this latter condition nothing can be said on the subject at present, as a very large goitre with urgent pressure symptoms has not been experimented on so far.

Case 1 came to hospital voluntarily because the goitre was painful. Cases 2 and 3 came to hospital voluntarily as they were suffering from various indefinite pains all over the body which they thought were due to the goitre. Cases 4 and 5 were ordered to hospital by their chief. Case 6 applied for treatment because his goitre was painful. Case 7 applied for treatment because she was weak, anæmic and stated she had pressure symptoms. Case 8 was similar to case 6. Case 9 applied for treatment after cases 2 and 3 returned to their villages; but this case wanted to be operated on and would not remain in hospital for a full course of treatment.

Case 1.—Kap Lio, aged 35, Burmese male, was admitted on 30-1-1924 from Low Chang village. Large painful goitre. No suppuration. Local application, glycerine and belladonna. Intravenous doses of tincture of iodine given:—

| | | | |
|-----------|----|----|------|
| 18-2-1924 | .. | .. | m. 6 |
| 21-2-1924 | .. | .. | m. 8 |
| 23-2-1924 | .. | .. | m. 9 |
| 25-2-1924 | .. | .. | m. 9 |
| 28-2-1924 | .. | .. | m. 9 |

Immediate results—no appreciable decrease.

This patient was ordered to attend hospital on 5-9-1924 for inspection. He had now got a goitre only about the size of a bean. The tincture of iodine treatment was not tried on other cases as this man could not be got hold of before. It is evident that tincture of iodine acts in the same manner as sodium iodine. On admission this man's goitre was very large.

Case 2.—Mangell, aged 25, Burmese female, was admitted on 3-5-1924 from Kholai village. The patient was dwarfed but well developed. History of goitre in grandmother, mother and sister. The goitre was large, lobulated and hard. She was a cretin to a certain degree, and was slightly deficient mentally.

Treatment adopted:—

Sodium iodide grains 8, t.d.s., orally.

7-5-1924: Sodium iodide stopped. Placed on thyroid extract (2½ grs. each), two tablets daily.

10-5-1924: 1½ tablets daily.

9-5-1924: Subcutaneous injection of sodium iodide, grs. 6.

12-5-1924: Subcutaneous injection of sodium iodide, grs. 6.

The patient could not understand why her sister was being given injections, whereas she was receiving none. For this reason she was given the subcutaneous injections; these also proved that a subcutaneous injection of sodium iodide produced no ill-effects and that while giving an intravenous injection, if the vein is accidentally missed no harm results.

19-5-1924: Thyroid gland extract discontinued. Put on to sodium iodide by the month again.

Discharged on 17-6-1924. The patient was improved to a certain extent. On the 10-9-1924 the patient was again seen, and it was found that the goitre was only the size of a walnut. She is now undergoing a further course of treatment.

Case 3.—Kwathing, aged 25, Burmese female, admitted on 3-6-1924 from Kholai village; sister of case 2; well developed, goitre not hard.

Intravenous injections of sodium iodide:—

| | | | |
|-----------|----|----|----------|
| 5-6-1924 | .. | .. | grs. 10. |
| 8-6-1924 | .. | .. | grs. 7. |
| 12-6-1924 | .. | .. | grs. 8. |
| 19-6-1924 | .. | .. | grs. 6. |
| 27-6-1924 | .. | .. | grs. 6. |
| 11-7-1924 | .. | .. | grs. 6. |

The patient was given sodium iodide orally as well.

In this case there was a certain amount of reaction after some of the doses. Discharged on 17-7-1924 with a certain amount of improvement. Seen again on 10-9-1924. It was found that the goitre had practically disappeared. She is under treatment for a further course.

Case 4.—Kathwan, aged 13, Burmese male, admitted on 4-5-1924 from Songte village, goitre about the size of a small orange.

There are a number of cases of goitre in this village.

Intravenous injections of sodium iodide:—

| | | | |
|-----------|----|----|---------|
| 7-5-1924 | .. | .. | grs. 4. |
| 10-5-1924 | .. | .. | grs. 5. |
| 19-5-1924 | .. | .. | grs. 5. |
| 25-5-1924 | .. | .. | grs. 5. |

The patient was also given a certain amount of sodium iodide orally. Discharged from hospital on 3-6-1924. Goitre on discharge from hospital was reduced somewhat: seen again a month and a half later, the patient had no signs of goitre whatsoever, his neck being quite normal.

Case 5.—Neikwal, aged 8, Burmese male, admitted on 4-5-1924 from Songte village. This case was treated orally for the same period as case 4 and was discharged from hospital on the same date, i.e., 3-6-1924. Was not given sodium iodide intravenously. When seen a month and a half later the patient's goitre was much reduced, but had not been completely reduced. He was then given a further course of three intravenous injections of sodium iodide, grs. 5 each. The goitre after this disappeared completely.

Case 6.—Phunlul, aged 25, Burmese male, admitted on 5-5-1924 from Tung Thu village. The patient came to hospital with symptoms of suppurating goitre. This was incised and drained. Steady uninterrupted recovery.

Case 7.—Naokim, aged 32, Burmese female, admitted on 12-5-1924 from Tashon village.

Patient gave a history of fever. Was very anæmic and stated that she was unable to swallow properly. From the onset she was treated for her anæmic condition, in addition to being given sodium iodide. The size of the goitre was larger than an orange.

Intravenous injections of sodium iodide:—

| | | | |
|-----------|----|----|---------|
| 13-5-1924 | .. | .. | grs. 6. |
| 16-5-1924 | .. | .. | grs. 6. |
| 28-5-1924 | .. | .. | grs. 6. |
| 11-7-1924 | .. | .. | grs. 6. |
| 18-7-1924 | .. | .. | grs. 6. |

On 2-6-1924 sepsis supervened. A small abscess formed; this was incised on 15-6-1924 and it healed before her discharge from hospital. She was seen on 4-9-1924 and it was found that the goitre was the size of a bean. Refused further treatment as she said her mother could not spare her from her fields.

Case 8.—Ramshuar, aged 45, Burmese male, admitted 14-5-1924, absconded 11-7-1924. This was a protracted case of suppurating goitre. The gland was very large and the whole of it suppurated.

No internal treatment was given to this case. Shortly before he absconded he came out with an eczematous rash about the neck and chest, and in fact wherever the pus from his goitre touched his body. He was being treated for this condition when he disappeared from hospital and has not been seen since. The patient was mentally deficient to a marked degree.

Case 9.—Tialchi, aged 15, Burmese female, Kholai village. The patient applied for treatment from the same village as cases 2 and 3, after seeing the improvement in these cases: her goitre was small. She was given two intravenous injections of sodium iodide, grs. 5 each. She asked for an operation, and as this was refused she would not remain in hospital for further treatment. She was seen again on 10-9-1924; the goitre had almost disappeared in spite of her having received only two injections of sodium iodide.

Points of importance are:—

Whether after the goitre has been reduced to normal, is it going to remain so, or is it going to recur?

We are of opinion that it is going to recur, so long as the patient remains in his original surroundings. Even if all the cases do not recur, a greater majority are bound to recur.

Granted that after a cure the patient is moved to a more suitable place with a varied diet there may be no recurrence. We are dealing with the Chin and we know that this cannot happen here. The Chin is too poor, too ignorant, too attached to his village, surroundings and customs to migrate. He does not wish to separate himself from his village if he can possibly help it. So that other means must be found for the prevention of the

recurrence. This is most essential, otherwise all the good done will be undone when such patients find that their disease recurs, after they have submitted to intravenous treatment.

If sodium iodide could be issued in tablet form it would be convenient and could be used as follows:—

(1) The hospital could keep a stock for those who wish to apply for the drug and to take it, say for a short period, 2 or 3 times yearly.

(2) The sub-assistant surgeons in charge of the travelling dispensaries could carry a stock of the same tablets and issue them in villages to all patients previously treated.

(3) The Political Department could be given the drug for distribution, or sale if desired, to villages. They could arrange with the village chiefs with regard to the supply of the same.

A chemically pure supply of the drug is necessary for intravenous injections to ensure safety.

It will be seen from case 1 that tincture of iodine acts in the same manner as sodium iodide. The benefit of using the tincture is that it is practically aseptic, but it is likely to cause irritation to the tissues to a certain degree; if a vein is missed this would clear up, though only after a short interval. With sodium iodide, unless the drug is chemically pure, we cannot say what we are introducing into the vein. In its favour is the fact that it does not cause irritation. We have experimented with it subcutaneously and find that there are no ill-effects from this method, in fact it may have benefited case 2 considerably.

Besides the three patients now attending hospital, three other cases are being treated as in-patients at present. Since writing this article several other cases have recovered after intravenous treatment of a similar character.

A Mirror of Hospital Practice.

THE TREATMENT OF MALARIA IN PREGNANT WOMEN.

By J. DHAIRYAM, L.M.S.,

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THE treatment of malaria in pregnant women was formerly a bugbear to me; and my difficulty knew no bounds when I was faced with a case of malaria in a woman pregnant some 7 or 8 months and with a temperature of 104 to 105° every other day. Especially great is the difficulty if the patient is a poor woman and cannot afford to get out of the malarial tracts.

In medical practice quinine is the drug which causes cures in malaria, but it is also a drug which is stated to cause abortion. The small doses of

2 to 3 grains daily of quinine advocated by some medical men for this condition are useless, whilst malaria by itself may bring on the abortion which we dread under quinine therapy. Also the continued malaria shatters the patient's system and renders it difficult for her to pass safely through the critical period of delivery.

In tackling such cases I have hit upon a method of treatment which I have found valuable and reliable during the past three years in the Agency Tracts of Madras, an area where malaria is both rife and severe, and where almost every pregnant woman gets one or more attacks of malaria during her pregnancy. It is as follows:—

(1) The bowels having been well opened by castor oil or calomel, 10 grains of potassium bromide are given in solution.

(2) Half an hour later 10 grains of acid hydrochloride of quinine is given by intramuscular injection, together with a second dose of 10 grains of potassium bromide in solution by the mouth.

(3) Half an hour after the injection, a third dose of 10 grains of potassium bromide is again given in solution orally.

This course is repeated on the second day. From the third day onwards I give 10 grains of potassium bromide, followed half an hour later by 7 grains of quinine sulphate, both in solution and given orally three times a day.

Since adopting this method I have never experienced difficulties in the treatment of malaria in pregnant women, and have had no failures of treatment. Extract *Prunifolium Viburnum Liquidum* may be added to the bromide mixture if desired, but the simple bromide mixture in itself is sufficient. Whatever the experience of others, if proper precautions are taken with regard to asepsis, I have never seen bad results to follow such intramuscular injections of quinine.

AN INTERESTING CASE OF ORIENTAL SORE.

By D. N. BASU, M.B. (Cal.), D.P.H. (Camb.), D.T.M. (Liverpool),

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A HINDU girl aged 5, with a sore on her right cheek was brought to me in Calcutta for consultation at the end of November 1924. At that time there was no evidence of any crust on the sore, but a definite inflammatory marginal zone was present. The glands of the neck were enlarged. On enquiry I was told that she had never been out of Calcutta, and I gave instructions that I would see the case again a fortnight later.

She was again brought to me on the 20th December, 1924. By this time the sore had increased considerably in size, and there was a very marked scab. I punctured the edge of the sore and found *Leishmania tropica* parasites present.

On further pressing enquiries, it transpired that the patient had left Calcutta in the third or fourth week of October 1923, halting on her way at Benares for a couple of days. She reached Ferozepore in the Punjab at the end of October



1923. There she had an attack of fever—(cause undiagnosed)—but recovered in a week's time and returned to Calcutta at the end of November 1923. She kept in good health, except for an occasional attack of fever of mild type, until February 1924, when a vague type of skin disease appeared. In April 1924, she had an attack of what was diagnosed as chicken-pox. Early in June 1924, a papule appeared on the right cheek, which ultimately enlarged into the lesion shewn in the photograph (January 1925), and shewed numerous *L. tropica* on examination. Thus the incubation period of the lesion was apparently some six and a half to seven months, since Calcutta is not an endemic centre of oriental sore.

The patient was taken to the laboratory of Major R. Knowles, I.M.S., Professor of Protozoology, Calcutta School of Tropical Medicine, who independently confirmed the finding of *L. tropica* in films from the lesion. Cultures on N.N.N. medium from the exudate of the lesion gave a rich growth of the same parasite in its flagellate form. The patient's spleen was not enlarged, and there was no fever at the time of examination, but, on Major Knowles' suggestion, cultures of the peripheral blood were taken by Row's method in order to exclude the possibility of the lesion being one due to dermal

leishmanoid," caused by *L. donovani* and following on unrecognised kala-azar. These cultures of the venous blood, however, remained sterile and negative and the lesion was clearly due to *L. tropica*. The case is of interest in that the period of incubation can here be definitely established as having been 6½ to 7 months. A second further point of interest in the case is that, when some 50 films from the cultures of *L. tropica* taken from this case were distributed to the current D. T. M. class at the Calcutta School of Tropical Medicine and stained and examined, in one of them a very curious "inversion" form of the parasite was seen. This single herpetomonad form of the parasite had its micronucleus situated posterior to—and not, as usual, anterior to—the macronucleus. Major Knowles has subsequently seen a similar inversion form in a culture of *L. donovani*. It is well known that *Trypanosoma rhodesiense* is capable of shewing such similar inversion forms, with the macronucleus situated towards the non-flagellar pole and posterior to the micronucleus; but this is apparently the first instance to be recorded of a herpetomonad parasite shewing a corresponding peculiarity. What the significance of such inversion forms is, is quite uncertain.

My thanks are due to Major R. Knowles, I.M.S., and to Temporary Assistant Surgeon B. M. Das Gupta, I.M.P., Assistant Professor of Protozoology, Calcutta School of Tropical Medicine, for investigations into the case.

A CASE OF ACUTE GASTRO-DUODENAL ILEUS.

By Capt. R. V. RAJAM, M.B., B.S., Tanjore.

AN Indian Christian, male, aged about 50 years, was admitted to the Headquarters Hospital, Palamcottah, with what appeared to be acute intestinal obstruction. He gave a history of flatulent dyspepsia with epigastric discomfort for nearly six or seven years before the onset of his acute condition. On the night of the attack, some hours before, he had partaken of an unusually heavy meal at a feast. The attack commenced with acute pain in the abdomen and vomiting.

Condition on Admission.—The patient was a lean emaciated man. The abdomen was enormously distended. The distension was more marked in the centre of the abdomen, from the epigastrium to the symphysis pubis. He was vomiting frequently small quantities of bile-stained fluid mixed with undigested pieces of meat and rice. His facies was typical of some acute intra-abdominal trouble. The temperature was subnormal. The pulse was small in volume and 110 to the minute. There was no rigidity of the abdominal wall but diffuse tenderness all over the abdomen, especially marked in the supra- and sub-umbilical regions. There was no visible peristalsis. The

pain was diffuse and continuous. A large and high enema of soap and water gave a good result, but the distension and vomiting were unaffected even by repeated enemas. The patient was prepared for a laparotomy. The abdomen was opened by a sub-umbilical para-rectal incision on the right side. A distended viscus presented at the opening. The incision was enlarged upwards for better exploration. It was found that the stomach was enormously distended. It filled the whole abdominal cavity, its greater curvature reaching to the brim of the pelvis. There was no peristaltic movement visible. On manipulation a splash was elicited. With great difficulty the distended paralysed stomach was lifted and gentle exploration revealed a distended duodenum up to its junction with the jejunum. The duodenum looked more like a distended colon. All the coils of the small intestine as well as the cæcum and part of the ascending colon were in the pelvic cavity and completely collapsed. There was no evidence of any ulcer in the stomach. There was nothing to show the presence of any mechanical obstruction by bands or internal hernia. The abdomen was closed by through and through stitches as the patient's condition was bad, and as I did not understand what I should do for the condition. As soon as the patient recovered from the anaesthetic, he was placed in the Trendelenburg's position and gastric lavage was commenced. It was repeated every two hours. Injections of pituitrin and eserin salicylate were given four-hourly. The patient's condition did not improve and he died 48 hours after the operation. A post-mortem examination could not be had as the relatives took away the body.

A reference to the ordinary text-books on surgery did not help me to understand the cause of this condition. Paralytic ileus of the stomach has been met with as a post-operative complication, especially after operations on the upper abdomen and biliary passages. But in this case there was no such antecedent cause except the history of epigastric discomfort and flatulent dyspepsia. Then Mr. Wilkie's article on chronic gastro-duodenal ileus in the *British Journal of Surgery* and his subsequent lecture on the same, published in the *British Medical Journal* of 1922 enlightened me on the pathogenesis of this condition. According to him the condition is not very rare, but the symptoms have been mistaken for gastric or duodenal ulcer. The disease runs a chronic course, often extending over years, with a great tendency to an acute and fatal exacerbation. It is due to the pressure of the superior mesenteric vessels on the terminal part of the duodenum, which they cross almost at right angles. Normally with the abdominal viscera in their proper place and with a normal tonic condition

of the abdominal muscles, this vascular arch does not exert any mechanical pressure on the duodenum. But in conditions where there is a general visceroptosis, especially of the small intestines and proximal colon, the tension on the mesentery caused by the dropping down of the intestines acts on this vascular arch and compression and mechanical obstruction set in. In the case cited it was observed at the operation that there was marked visceroptosis of the small intestines and proximal colon into the pelvic cavity; and it is quite probably the root cause of the condition. The history of flatulent dyspepsia and epigastric discomfort for a number of years shows that he had been suffering from chronic gastro-duodenal ileus as a result of the visceroptosis. The acute and fatal attack for which he sought admission to the hospital had supervened on the chronic condition. As I was quite unaware of this, I did not look for the arch of the superior mesenteric vessels crossing and compressing the terminal part of the duodenum at the time of the operation. Further, even if the condition had been recognised, the state of the patient was such that no anastomosis operation would have been possible. Operation is not indicated in the acute variety. Only gastric lavage with the patient turned on the face to relieve the pressure on the duodenum has been recommended, and has met with success.

The symptoms of the chronic cases are very liable to be mistaken for gastric or duodenal ulcer, though the latter may arise as a late complication. A long-standing history of flatulent dyspepsia with epigastric discomfort rather than actual pain, with intervals of relative freedom should always raise the suspicion of duodenal ileus. Operative treatment has given the best results in chronic cases. Colopexy suffices to cure the condition in those cases where the tension on the mesentery is due to a mobile and prolapsed proximal colon. But in cases where the drag is due to the prolapse of the small intestines, a duodeno-jejunostomy has given the best results, that is to say anastomosis of the third part of the duodenum proximal to the obstruction to the first coil of the jejunum.

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A CASE OF INTESTINAL OBSTRUCTION ASSOCIATED WITH THE FOSSA DUODENO-JEJUNALIS.

By J. B. VAIDYA,

CAPTAIN, I.M.S.,

Medical Officer in charge, Cantonment Hospital, Deolali.

R. P., aged 30, was admitted to hospital for intestinal obstruction of two days' duration. He

had constipation during the period and pain; did not pass any stools or flatus. Vomiting was rare and occurred twice or thrice during the whole period before the admission. The abdomen was hard, distended and tender. The distension was all round the abdomen for a distance of three inches and looked globular. The hernial apertures were normal.

The abdomen was opened in the middle line below the umbilicus. On opening the peritoneal cavity, no coils of small intestine were visible; but instead a glistening tense tumour was noticed occupying the middle of the abdomen, extending more to the left side and coming down to about one inch below the umbilicus. The incision was extended upwards. The small intestine was found enclosed inside this tense sac. The sac was opened and the small intestine came out with a little straw-coloured fluid. The sac had formed recent adhesions all round and these were easily broken with the finger. The intestines were distended, and in one part showed slight discolouration. The large intestine was empty. In the duodenal region there was noticed a constricting band under which the small intestine had passed. This band was divided between ligatures and part of the sac cut. The contents of the small intestine were let out and the opening in it sutured up. The abdominal cavity was closed after introducing into it saline and a draclm of ether.

The patient was in a poor condition when he left the table, but rallied with injections of saline and glucose, and pituitrin. Stimulants were given as required.

After 12 hours the man passed soft stools per anum. He continued to pass stools per rectum, but the second day after the operation the stools were very frequently passed in small quantities.

The wound was inspected on the second day after operation and looked clean. There was a little distension of the abdomen; but no rigidity of the abdominal wall was noticed and there was no tympanites. However, the general condition was very poor and the man died on the third day after the operation.

As regards the nature of obstruction, I think that the small intestine got into the fossa duodeno-jejunalis and pushed out the peritoneum in the form of a sac in which it was enclosed.

Treves, in his "Surgical Applied Anatomy," says:—"The commencement of the jejunum presses into the fossa (fossa duodeno-jejunalis), enlarges its cavity and ultimately separates the peritoneum from its posterior attachments; more and more of the small intestine passes into the increasing pouch until at last nearly the whole of the small intestine may be found lodged in an enormous median retro-peritoneal sac, the mouth of which is the orifice of the fossa duodeno-jejunalis. The duodenum can be seen to enter the sac and the end of the ileum to leave it. The sac usually extends downwards on the left side and may reach the promontory of the sacrum."

I have to thank Colonel R. H. Lloyd, A.D.M.S., Bombay District, and Lieutenant-Colonel A. C. Adderly, D.S.O., R.A.M.C., S.M.O., Deolali, for allowing me to publish this case.

A CASE OF RECURRING AND ENCYSTED VESICAL CALCULUS.

By S. KANTHIMATHY NATHAN, L.M.P.,
Resident Medical Officer, Government Headquarters Hospital, Anantapur.

A young lad by name Naranappa, aged 16 years, was admitted to this hospital on the 3rd December, 1924, for a persistent fistulous opening in the hypogastric region, through which urine was always dribbling and soiling his clothes. On the 13th March, 1921, he had been previously admitted to the same hospital for stone in the bladder, and a big stone weighing 6 drachms 13 grains was removed by suprapubic cystotomy. The bladder and abdominal walls were closed, and the boy was discharged cured on the 19th March, 1921, the wound healing by first intention. For two years he did well and passed urine quite comfortably. In the middle of 1923, he began to experience the old urinary trouble and began to be quite uncomfortable and suffered much from difficult micturition. About the month of January 1924, he felt excruciating pain in the hypogastric region which began to swell up. On applying poultices the swelling gave way at the site of the previous operation by ulceration, through which urine came out freely. A fairly big stone was perceptible through the wound. This state of affairs continued for some time. In the month of September 1924, on a particular day, there was acute retention of urine owing to the blockage of the suprapubic wound by the stone and urethral obstruction as well. When the boy strained to his utmost in his anxiety to drive his urine out, out came a big stone through the abdominal wound with a rush of urine. The boy says that, as the result of the stone coming out through the abdominal wall, a big ulcer was formed and it had not healed, but had left a fistulous opening.

At the time of admission it was found that a small fistulous opening, surrounded by thick scar tissue $2\frac{1}{2}$ in. by $1\frac{1}{2}$ in. in area, as a result of a long-standing ulceration, ran into the bladder. The boy brought with him the stone said to have been passed through his abdominal opening. It weighs 7 drachms and 50 grains and is of phosphatic origin.

For about ten days under antiseptic dressings the fistulous opening shewed no sign of healing. On passing a probe through the fistula, it went deep into the bladder and hit on a stone in the bladder. It was found by sounding per urethram that some more stones were encysted at the mouth of the bladder, making

it difficult to pass the sound into the bladder. Rectally two stones were felt in the prostatic region and grated on each other on moving. On trying to wash out the bladder, the boric lotion did not pass freely inside, neither did it fill the bladder. A grooved director was passed through the fistulous opening until it impinged on the stone, and the bladder was laid open with a knife passed along the director. On passing the finger into the bladder, the stone was not lying free on the cavity but was found encysted under cover of the mucous membrane in the posterior wall near the neck of the bladder. The cavity of the sac containing the stone communicated with the bladder through a small opening. This opening was enlarged and two phosphatic stones weighing 1 drachm 45 grains were removed with some difficulty. The bigger one of the two stones had to be pushed into the bladder by insertion of the finger into the rectum.

The suprapubic wound is healing well and the boy now passes most of his urine through the urinary passage.

I am much indebted to Dr. U. Ganapathi Rao, B.A., L.M.S., District Surgeon, Anantapur, for his kind permission to publish this, one of his operation cases, which is unique on account of the recurrence of the stone three times (the last one being encysted) in the course of three years in such a young boy.

HÆMOPLASTIN IN HÆMORRHAGE.

By KAMAKHYA PRASAD LAHIRI, L.M.S.,
Bera P. O., Pabna District.

PHYSICIANS practising in the mofussil are often confronted with cases of hæmorrhage of obstinate type from different organs of the body; and are often put to great anxiety in their treatment, especially with the slender resources at their disposal.

Some time ago, I had to deal with a patient, a Brahmin lady, 50 years of age, suffering from uterine hæmorrhage. She had had a female child 30 years before, which had died within a few days of its birth. I suspected a hæmophilic taint, as she gave a history of profuse bleeding from the gums some three years previously, which had only been arrested with difficulty. She had consulted a specialist in Calcutta who could find nothing abnormal in the internal genitalia, but she stated that she had been losing a considerable quantity of blood daily for the previous 20 days. In fact menstruation had not stopped but had become almost continuous, with passage of fluid blood, and sometimes of clots. She was extremely anæmic on examination, but otherwise everything appeared to be normal. On my first visit I gave ergotinin hypodermically, and prescribed calcium lactate in 10

grain doses to be taken alternately every three hours with a mixture containing liquid extracts of ergot, hydrastis, hamamelis, and *asok*,—(*Saruca indica*, Linn., a drug highly valued by Hindu physicians in uterine affections and especially in menorrhagia). This was continued for two days with no improvement, when injections of B. W. and Co.'s Tabloid Ergotoxine were added, without improvement. Adrenalin and pituitrin were next tried without benefit, and also emetine, as advocated by Monro in cases of hæmaturia (*Practitioner*, September 1918). The patient's condition was now serious; she was blanched, with a quick pulse of low tension and too ill to be removed to Calcutta for treatment.

Having read of "Hæmoplastin" (Parke Davis & Co.), in their "Therapeutic Notes," I tried a first dose of 2 c.c. subcutaneously with some diffidence. Improvement was immediate; especially after the second dose, whilst all hæmorrhage stopped after a third dose. A fourth dose of 2 c.c. was given; i.e., 8 c.c. in all, one such dose daily for four days. The patient made a complete recovery subsequently on a course of treatment with iron and strychnine, and to-day, more than a year later, is in excellent health.

A second interesting case was one of internal hæmorrhoids with a marked familial history. The patient's father died from the effects of hæmorrhage from piles at an advanced age, whilst a brother succumbed from the same cause after some years of suffering. A second brother died of sequelæ following hæmorrhage from piles in Calcutta some time previously. The patient was aged about 35 years and had been suffering from hæmorrhoids for 4 or 5 years. Bleeding was more or less intermittent, and his condition was bad. I advised him to go to Calcutta for operation, but he stated that he had already been advised in Calcutta that this was inadvisable. He was thoroughly alarmed and expected a fatal issue. Hæmoplastin was employed, both subcutaneously and locally; four injections, each of 2 c.c., being given hypodermically in four days. The patient is at present in good health and free from hæmorrhage.

I am aware that two isolated cases do not prove much; but the possible value of hæmoplastin in the treatment of cases of obstinate hæmorrhage seems well worth further investigation and trial.

TWO CASES OF TETANUS TREATED BY INJECTIONS OF MAGNESIUM SULPHATE AND CARBOLIC ACID.

By P. D. SAMUEL, L.C.P.S.,
C. B. M. Dispensary, Parlakimedi.

IN the *Indian Medical Gazette* for June 1923, p. 263, I advocated the treatment of tetanus by

injections of 15 m. of a 1 per cent. solution of carbolic acid, together with a routine mixture by the mouth. In the *Journal of Medical Missions in India* for April 1923, I came across an interesting article by Dr. Caleb Davies on the therapeutical uses of magnesium sulphate, in which he advocated its use as a nerve depressant in the treatment of tetanus, chorea, eclampsia, and as an adjuvant in anæsthesia.

In the following two cases of tetanus subsequently treated by me, no antitoxin was used, whilst the routine mixture previously suggested could not be made up, owing to the lack of certain of its ingredients in the dispensary.

Case 1.—Katcharijito, Pano by caste, male, aged 8 years, was brought to the dispensary by his parents on the 20th August, 1923. On admission he was unable to open his mouth fully, found difficulty in swallowing, and had occasional convulsions. A slight injury was present on the head a little above the temporal region. His speech was not clear and he was restless at nights.

Treatment.—(a) Daily injections were given of 25 minims of a 25 per cent. solution of magnesium sulphate in the morning, and of 15 minims of a 1 per cent. solution of carbolic acid in the evenings.

(b) A mixture containing 10 grs. of sodium bromide, and one drachm of magnesium sulphate was given four times a day until he left hospital.

The symptoms gradually decreased during his first week in hospital, and he could open his mouth and take liquid diet. At the end of the second week he could take rice, and at the end of the third he could walk and sing. He was discharged cured on September 14th.

Case 2.—Pakiru, Pariah by caste, male, aged 7 years, was admitted to hospital on the 5th March, 1924 for treatment of an ulcer over the external canthus of the left eye, the result of a ruptured boil. The customary antiseptic dressings were employed.

On the 6th March the patient shewed slight paresis. His mouth was slightly turned to the right side, and his speech difficult. Owing to the situation of the ulcer, the case was taken for one of facial paralysis.

The ulcer commenced to heal, but the symptoms became aggravated, and on the 10th March clonic convulsions appeared, about 8 to 10 a day, increasing in number during the night. Sodium bromide in 10 grain doses t.d.s. was given, but without effect.

The next day the jaw was entirely locked, especially on the left side, permitting the passage in of food only through a small aperture on the right.

Injections of magnesium sulphate and of carbolic acid in the same doses as in Case 1, were now given, together with 10 grains of sodium bromide b.d.

By the 13th, the number of convulsions was reduced to 2 or 3 a day, but he had had no sleep. On the 16th he was better, but still unable to take in food by the mouth, and still on a liquid diet. On the 19th he slept, sleep being disturbed by two mild attacks. He could also partially open the mouth and take a little rice.

On the 21st, the injections were discontinued, and a mixture containing 10 grains of sodium bromide and one drachm of magnesium sulphate given orally t.d.s. On the 31st March he was discharged cured.

It would appear from the cases cited, and from these two further cases, that in mofussil practice, treatment by such injections may cure cases without recourse to the costly antitoxin, or where such antitoxin is not available.

My thanks are due to Dr. J. H. West, M.D., C.M., for advice and assistance.

Indian Medical Gazette.

APRIL.

THE MEDICAL RESEARCH COUNCIL.

WE in India, are specially interested in the working of the Medical Research Council of the United Kingdom as it plays the same part as our Indian Research Fund Association.

The funds of the Medical Research Council are derived from the Imperial Parliament, which sets apart a small proportion of the income derived from the working of the Insurance Act. Although the proportion of the imperial revenues which are allotted to research is small, it is vastly important that the principle has been established that there should be a definite reservation for research. Experience has shown that the due development of agriculture, industries and medical knowledge depends on the work of the investigator, and already the results which have been attained are such that any change in policy in the future must be in the direction of allotting a larger proportion of the revenue for research.

The work done by the Medical Research Council is directed partly to the solution of definite problems and partly to the promotion of medical knowledge in general, and it is most encouraging to find that, when a specific problem is directly attacked, medical knowledge in general has been found to benefit, and on the other hand each addition to medical knowledge helps in the solution of specific disease problems.

Although the scheme has been in active operation only for a short time, the fruits of research have been so great that they are already of great importance and are becoming more valuable every year.

The greater proportion of the available funds has been spent on subsidising existing educational bodies, either in the form of subsidies to persons who have proved their capacity for research work or in the form of grants for the promotion of special investigations; no less than £80,000 have been spent in this way last year. Rather more than half this amount is spent on the National Institute of Medical Research and its associated field laboratories. The chief problems which have been dealt with by the National Institute are those of physiology, pharmacology and biochemistry. But the work which has been carried out is far from being academic in nature, it has more or less direct bearing on the problems of disease and inefficiency.

The conspicuous success of the Research Council has been due to the policy of making the greatest possible use of existing institutions and to the broad-minded administration of Sir Walter Fletcher.

The Indian Research Fund Association was established on the same lines and has carried on work of vast importance to India, but owing to the unfortunate curtailment of its funds in consequence of the report of the Inchcape Retrenchment Committee, its activities have been sadly crippled.

The damage which has been done is not confined to the interruption of valuable research work, almost more serious is the harm which has been done by the blow which was struck at recruitment of research workers.

If research is only to be subsidised in years of prosperity and is liable to be shut down when a cry for retrenchment is raised, it is impossible to adopt a settled policy or to attract suitable men to the research cadre.

We cannot too strongly emphasise the necessity of adopting a consistent policy, such as has so wisely been adopted by the British Government in England, if medical research is to continue to bear fruit of increasing value to this country.

It is understood that the meagre grant to the Indian Research Fund Association is to be restored, at least in part. There must be some guarantee that this grant will not be at the mercy of the finance department or of the party politician.

If a settled grant be given which will bear some proportion to the total revenue of Government, the next important business is to work out a policy for the most effective utilisation of the income of the Association.

In view of the fact that a statesmanlike policy was adopted by the Association at the time of its inauguration by men like Sir Harcourt Butler and the late Sir Pardey Lukis, and in view of the great success which has attended the pursuit of a similar policy by the Medical Research Council in England, it is reasonable to expect that the same lines will be followed by the Research Fund Association with the funds which are now being placed at its disposal.

The first thing to be done is to make the fullest use of the men who are available and of the existing institutions. We have seen the abandonment of the important work of Lieutenant-Colonel R. McCarrison because of the need for retrenchment; we have seen the great nursery for research workers of the future, the Calcutta School of Tropical Medicine, compelled to carry on without an expert helminthologist, without a biochemist and without a museum of hygiene; we have seen the Bombay School of Tropical Medicine still-born because of lack of funds; we have seen other research laboratories hampered for

want of workers and recruits. The removal of these defects will doubtless be the first object of the Research Fund Association in any enlarged programme.

The encouragement of young men who show aptitude for research will rank high in the programme, and so will the provision of workers for the attack on the many disease problems which exist in India.

It is certain that the available funds will yield a far greater return if the greatest use be made of existing institutions, and if the available money be spent on men instead of on a brick and mortar policy such as led to the undoing of the Research Fund Association in the past.

The best interests of the country will be served by the employment of the best available men, and by the building up of a band of competent research workers. The men who are employed should be located at the places in which they can do the most effective work, whether this be at existing research centres or in the field.

In the words of Sir Harcourt Butler, "we must think imperially," and we should go a step further and act imperially.

SUB-ASSISTANT SURGEONS' ALLOWANCES IN BENGAL.

As a result of the recommendations of the Retrenchment Committee in Bengal, certain allowances hitherto enjoyed by the Sub-Assistant Surgeons have been abolished. These are (1) house-rent in the case of those posted to sub-divisional headquarters and (2) teaching, house-rent and medico-legal allowances in the case of those holding posts of demonstrators in the medical schools, and teachers of compounder classes where they exist.

The Sub-Assistant Surgeons submitted a representation to the Surgeon General for transmission to Government in which they set forth their grievances owing to the abolition of their allowances and prayed for their restoration. One of the grounds urged was that when the time scale of pay was introduced in 1921 on the report of the Medical Services' Committee, assurance was given in Government Resolution No. 1998, dated the 22nd July, 1921, that the various allowances hitherto enjoyed by the Sub-Assistant Surgeons would be continued to be drawn by them in addition to the new scale of pay.

The Government have replied to the representation regretting their inability to revise the orders, as they do not consider that the Sub-Assistant Surgeons have any grievance, because the orders about house-rent and medico-legal allowances do not affect the Sub-Assistant Surgeons now in

service, and those relating to teaching allowances are not applicable to the officers holding teaching appointments at the time the orders were issued.

All these cases may fairly be considered in the light of the laws of supply and demand. Government are quite within their rights in offering lower rates of pay to future incumbents, but it is doubtful whether the slight saving which will be effected will be a true economy. The prospects of teachers and demonstrators are hardly enough to attract the best men; if the pay is reduced, there will be still greater difficulty in recruiting for the teaching staff of the medical schools.

SPECIAL ARTICLES.

THE INSECT MENACE.

By F. P. MACKIE, O.B.E., M.D., F.R.C.P., F.R.C.P.S.,
LIEUT.-COLONEL, I.M.S.,

Director, Bombay Bacteriological Laboratory, Paré.

(Being the Presidential Address to the Medical Research Section of the Indian Science Congress, Benares, January 1925.)

BEFORE I begin my address, I wish to express the high sense of honour I feel at having been invited to the occupation of this Presidential Chair and being thereby privileged to follow in the steps of so many distinguished men.

For nearly twenty years in the Medical Research Department my principal interest has been in the relationship of insects to the transmission of disease, having devoted successive periods of time to fleas and plague, bugs and lice and relapsing fever, mosquitoes and malaria, tse-tse flies and sleeping sickness, and to the insect side of the kala-azar problem, so that I decided to take as my theme some reflections on this profoundly important aspect of tropical pathology.

If these remarks serve to draw attention to the grave problems which the people of India in particular, and of the tropics in general have to contend with, I shall feel that they have not been in vain.

I often think as I read the statistics which are published in the daily papers from time to time recording the number of persons killed every year in India by tigers, panthers and venomous snakes, how much more striking it would be if figures were published showing the number of persons killed every year by the bites of insects.

Tigers and snakes are unpleasant creatures to meet and spectacular in their actions, but the number of lives they claim is a drop in the ocean compared with the vast army of persons who die every year in India from the bites of insects.

In estimating the number of deaths caused by insects we may consider two classes of disease, firstly those which are conveyed by insects and by insects alone, and secondly those in the transmission of which insects undoubtedly play an important or contributory part.

In the first class we place malaria, plague, relapsing fever, guinea-worm disease, filariasis, dengue and sand-fly fevers, and almost certainly kala-azar. In the second class come a number of diseases, particularly those of intestinal origin, such as cholera, enteric fevers, the dysenteries and infantile diarrhoea, to name only the more important.

If we turn to the reports of the Public Health Commissioner for India, we read that in the last two years

for which statistics are available, the number of deaths in British India alone was as follows:—

Fevers (the large majority of which are malaria).

| | | | |
|---------|----|----|-----------|
| In 1921 | .. | .. | 4,761,000 |
| In 1922 | .. | .. | 3,689,000 |
| Plague. | | | |
| In 1921 | .. | .. | 69,000 |
| In 1922 | .. | .. | 77,000 |

This means that during the years 1921 and 1922, no less than eight and a half million persons died from insect bites in British India alone.

In the first six months of the year just passed (1924), 200,000 persons died from plague in the Punjab, whilst over ten millions of lives have been sacrificed to plague since the epidemic began about twenty years ago.

Now take those diseases where insects take some part in the transmission:—

The deaths from cholera are given as follows:—

| | | | |
|-------------------------------------|----|----|---------|
| In 1921 | .. | .. | 450,000 |
| In 1922 | .. | .. | 121,000 |
| whilst deaths from dysentery were:— | | | |
| In 1921 | .. | .. | 229,000 |
| In 1922 | .. | .. | 177,800 |

During the two years nearly one million persons died from these diseases.

All these figures represent deaths, but how many persons suffer from ill health as a result of repeated attacks of insect-borne disease? Their number is incalculable.

In the same report we read that Dr. Bentley has calculated that every year in the province of Bengal alone there are 28,300,000 persons suffering from malaria, and that if his calculations are applied to the whole of British India, there are not far short of one hundred million cases of malarial fever in any one year.

If we were to apply these methods of calculation to all the diseases known to have been caused by insects, and add to this a proportion of the second class of diseases in which insects play a contributory part, we shall see that the amount of disease, invalidism and death which occurs every year in India from the bites of insects is enough to stagger humanity.

It is evident from this that India has to bear an enormous economic burden from the incidence of preventable disease which is sufficient to prevent her rising to the position of importance to which her huge population and great resources entitle her. This aspect of the problem was most ably dealt with by the last President of this section, Lieutenant-Colonel S. R. Christophers, C.R.E., I.M.S., in his address at Bangalore last year when he took as his theme, "What disease costs India."

Let us now proceed to examine in greater detail this problem of noxious insects and their depredations.

The antiquity of insects.

The first thing which strikes one about insects is their great antiquity, and in consequence the perfection of their adaptability to environment.

Man is comparatively speaking a new-comer to the earth. He has only reached recognisable human characters for about half a million years or at most a million, for he only appears during the latest geological epoch, the Quaternary period, or at the earliest during the Pliocene period of the tertiary and for this a million years is a generous estimate.

But as far back as there are records of life on this globe, in the Cambrian rocks of the Primary or Palaeozoic period; many of the present classes of insects were represented, and throughout all those ages they have been evolving, multiplying in type, adapting themselves to an infinite diversity of conditions and later becoming fixed and immutable in their varying life processes to a degree which contrasts with the relatively fluid and plastic condition of the species of higher animals which have appeared so much later.

When as yet only the simplest aquatic Metazoa and worms existed on the earth, even then the primitive

forms of insects, the ancestors of those which we see to-day, began to be evolved. That period may be roughly taken as one hundred million years ago, and in that vast period the forces of evolution have produced the wonderful mechanism and the inexorable regularity of structure and function which we see in the insects to-day.

If we cast back in imagination to those times, we can imagine the brooding darkness of primeval seas made visible by the phosphorescent glow of myriads of marine crustaceans, whilst a few million years later when the only terrestrial inhabitants were gigantic reptiles more horrible than a madman's dream, their nocturnal browsings amongst the primitive palm groves were lit by the twinkling flash of fire-flies, probably in no wit different to those which we admire to-day in swamps and bamboo brakes.

As for the future of insects it has been humorously said, I think by H. G. Wells, that in the ages to come, when the last man sits shivering on the equator wrapped in furs and trying in vain to obtain warmth from the dying rays of a burnt out sun, there will be a fly buzzing round and waiting for an opportunity to settle on his nose.

The lesson to be learnt from these reflections is that insects have been here almost from the very beginning of time and will remain as long as any life is possible, so that we must make the best of them and learn when we may attack them to their greatest disadvantage. For these reasons the minute study of the life history of insects is one of the most profoundly important branches of tropical pathology, for it is only by taking every advantage which is offered that man may hope to defeat these, the greatest of all his enemies.

The marvellous qualities of organisation and perfect adaptation to environment are best seen in the so-called social insects, such as ants and bees. The social systems of these insects are so wonderfully ordered that they may be taken as models of what human society may one day attain to, indeed there are some who consider that we human beings cannot reach anything more perfect than the system already evolved by ants and bees.

They have their queen whose royal prerogative it is to lay vast numbers of eggs for the nurseries; the resulting horde of workers sterilised so that their capacities for work shall not be deflected by the lure of sex; their soldiers, scavengers, their flocks and herds and their small band of lazy but necessary males whose sole ambition is to take part in a nuptial flight, the victor's reward being total emasculation and to be hurled Icarus-like to the earth beneath. This is a gloomy outlook indeed for our sex—this state of rampant matriarchy in which the pleasure loving male shall be relegated to a position of permanent inferiority.

It is difficult to believe that this highly organised social system is not the result of conscious and intelligent direction, but it would be a mistake to suppose that this is so: the only directing influence in a hive is instinct, which is the summation of hereditary experiences, and there is no cause or justification for calling in reason to explain any of the complicated reflex actions of insects.

These facts help us in the destruction of insects because we know that no glimmer of intelligence will interrupt the preordained march of habit, as for instance in swarms of locusts which can be depended upon to advance unswervingly into fire or water rather than to deflect one hair's breadth from the drive of instinct.

The development of the parasitic habit of insects.

It is of great interest to ponder over the development of the parasitic habit and what it has led to.

This probably was an early development, for it must have been discovered that the easiest way to avoid the intense struggle for life in the primeval slime was for an insect to attach itself to some reptilian monster and to take cover under the overhanging shields with which it was armoured. It is probable that the ancestors of

Hyalomma and Amblyomma ticks infested the primitive reptiles, just as they do their smaller descendants to-day—firstly, for security and later as they developed the blood sucking habit, for food, and so they developed into true parasites.

When the birds came, there were other types of insect parasites evolved; first those that visited their hosts to feed on scraps of feathers or scurf and were free fliers. Later some learned to suck blood and found that flight was unnecessary as they could pass from one bird to another at roosting time, and so their power of flight was lost.

By some such process the Mallophaga or bird lice arose, once free fliers but in whom now the wings are atrophied and suppressed into mere vestiges.

The Nycteribidae of bats and the Hippoboscidae of domestic animals are probably undergoing this change to-day, as their flight has become restricted to a few feet around their hosts. It is probable that these lice of birds are amongst the most archaic of parasites, and as their environment has undergone so little change for ages they have become highly specialised and are now specific each for his own species of bird and quite incapable of living on an allied species of host. This fact has been well exemplified by an attempt which was made to connect genera of birds living in places as far apart as Australia and Patagonia by the fact that they were infected with identical species of Mallophaga.

The identification of the avian species was held valid on these grounds, although the geographical separation took place as long ago as the Jurassic period. At that period of the world's history a man (had he existed) could have walked dry-shod from South America across a land bridge to South Africa and thence through Madagascar and up to India and thence down to Australia by the great Asia-antipodean land bridge of which the only remains now above water are the islands of the East Indies.

This shows that ages which sufficed for a complete evolutionary divergence of birds were but a short time in the ancestral history of their insect parasites.

Of the insects which attack man some are entirely specific and therefore of great antiquity as parasites; such are the mites and the lice. These may have accompanied man in his upward climb from a simian or tarsian ancestry.

Mosquitoes have probably acquired the blood sucking habit more recently, for they are not specific to man but bite other animals, they are not complete parasites as for the greater part of their life they lead a saprophytic and aquatic existence. The vast majority of mosquitoes live and die without an opportunity of sucking human blood. On the other hand they have had a sufficiently long experience to become the final host of a highly specialised human blood parasite.

Tse-tse flies are probably still more new to the rôle of human blood-suckers, and this may in part explain the fulminating nature of the epidemics they transmit; their natural victims are the vast herds of animals which have roamed the plains of Africa since the tertiary period.

Fleas have developed strong predilections for their hosts, but are not entirely specific, whilst their disease transmitting powers do not bear the stamp of prolonged evolutionary experience. As for bugs they are not essentially but only casually human parasites and spend no part of their life history on his body. Either from lack of practice or from a benign disposition they do not appear to have taken up the evil habit of disease transmission, or at least this has not been proved against them.

House flies, Stomoxys and other muscids cannot be said to be human parasites at all, but are commensals or mess-mates which are apt to transmit certain diseases, generally bacterial, as a matter of incident in their life history. The bacteria undergo no essential stages of development in these insects, and we may call them "porters" rather than true "carriers" of disease.

To summarise what we have been saying, we may consider there to be several classes of disease carrying insects. Firstly, those which are specific to man and which spend the whole of their life history on his body. Such are the mites and the lice, and these from their habits should be capable of easy extermination. Secondly, those like mosquitoes, tse-tse flies, ticks and fleas, which are carriers of specific parasites and though living in part a saprophytic existence probably require blood for their full sexual development. Thirdly, those which are casual or occasional parasites such as flies and even rat fleas which for man are only incidental or accidental disease carriers.

The transmission of disease by insects.

If we examine creatures lower in the scale of life than man and of much greater antiquity, such as reptiles and amphibians, we shall find that they are all infested with intestinal protozoa and the large majority also carry blood protozoa such as trypanosomes, trypanoplasms and hemogregarines, all of which appear to be quite harmless to their hosts.

This probably represents the result of a struggle which at some earlier period was carried on between the parasite and the host, but which has now ended peacefully in a compromise between the two as a state of commensalism or harmless parasitism. If we could look back to the time when these blood parasites first established themselves in their reptilian hosts, we should find that epidemics of trypanosomiasis for instance swept through the reptilian world, just as they now sweep through human and animal populations in Africa to-day.

It may be that such epidemics were the cause of the extinction of the great prehistoric reptiles which roamed the world before the dawn of history, and that these succumbed to an infection which in their lesser brethren which survive to-day resulted in the state of equilibrium which now exists between reptiles and amphibians and their blood parasites.

The same argument may be applied to parasitic diseases of higher animals. Take rats for instance: they are infected with a trypanosome which has habituated itself long enough to become specific for the rat and long enough to have almost succeeded in establishing itself as a harmless parasite. In places where this infection is endemic, the young rats suffer from an infantile disease which is probably rarely lethal and to which the adult rats are immune carriers of the infection.

This is paralleled by the infantile diseases to which our children are liable, such as measles and chicken-pox, which at some earlier period were doubtless mortal diseases, but now by reason of hereditary or racial immunity have become comparatively innocuous. This is exemplified by the well-known fact that when measles was introduced into the Sandwich Islands, it gave rise amongst the non-immune natives to a virulent epidemic with a mortality comparable with that of bubonic plague.

The state of equilibrium referred to is as advantageous to the parasite as to its host, for it is obvious that if the disease produced is sufficiently deadly to destroy the host, it will result also in the death of all the parasites which are dependent on that host for their sustenance. The result of this is that the parasite reduces its toxicity, and the host develops some degree of tolerance, so that ultimately the two lie down together like the lion and the lamb, whose charming communism is so optimistically foreshadowed in Isaiah.

If we apply these principles to insect-borne diseases, we may believe that when these diseases were first evolved they were severe and assumed epidemic proportions, whereas the longer they exist the less severe they become.

So for instance in course of time, provided the human race survives its ravages, malaria will set up a condition of harmless equilibrium and the parasites flourish in its human host with satisfaction to themselves and without harm to their host. Such a happy

state of affairs probably exists already in bat and monkey malaria and in some plasmodial and trypanosome disease of wild animals.

Even in human malaria there are endemic centres of low toxicity, low that is to the endemic population, and this exists in parts of Central Africa and of India. In these communities the children all become infected and take malaria as an infantile disease, whilst the adults are all carriers and themselves show no sign of disease. The arrival of non-immunes in such a community results in intense and often fatal infections amongst the new comers.

As to exactly how these micro-parasites came to establish themselves in human beings, is a matter of conjecture. The most generally accepted hypothesis is that sporozoan flagellates and other blood parasites were originally harmless inhabitants of insects and evolved the habit of transmission from one host to the other at some later period of development. Many, if not most, insects harbour intestinal protozoa, and as they developed the blood-sucking habit their parasites accustomed themselves to the rich and easily assimilable food which blood provides. It was then found that when these protozoa were introduced into the blood stream of their vertebrate hosts they were able to establish themselves there and so set up an "alternation of generations."

They may have found their way to the blood stream by some simple method, as through a surface abrasion or through the puncture made by the insect in biting such as is seen in plague, relapsing and tick fevers.

An alternative method of introduction is by a soiled proboscis, where an insect bites a diseased animal and forthwith bites a healthy one and so carries infection from the one to the other, just as one might do with a dirty hypodermic needle. It was considered at one time that human sleeping sickness was carried in that way, and we still believe that this is the method by which tabanids and *Stomoxys* transmit surra of horses and camels.

A further adaptation is that met with in some trypanosome diseases of animals, e.g., *T. vivax* where simple multiplication of the parasites goes on in the lumen of the insect proboscis and is passed on after a short period of development. This we may liken to the multiplication of germs in the lumen of a dirty hypodermic needle. The final stage of complexity is represented by those cases in which the protozoon finds its way into the intestinal canal of the insect and there undergoes a cycle of development, and, after a period of non-infectivity, finds its way into the salivary glands and thence in a highly infective state into the blood stream of another vertebrate host.

The most typical example of this is of course the malarial parasite in the mosquito, whilst the development of the trypanosome of human sleeping sickness in the tse-tse fly is a scarcely less perfect instance.

This crescendo of complexity is in itself suggestive of the origin of the blood protozoa from the harmless intestinal commensals of insects. It has recently been maintained by well known protozoologists that the intestinal flagellates, even of non-blood sucking insects, can give rise to a Leishmania-like disease in laboratory animals, and that, for instance, the parasites of a water flea will give rise to disease and death when injected into a mouse, two creatures which never come into contact with one another in Nature.

Although their experiments seem to be well grounded, it is only fair to state that they have met with opposition from and refutation by those who sought to confirm them, and indeed such astonishing results can only be credited with difficulty.

The alternative hypothesis of the evolution of the parasitic habit is that the tissue parasites of vertebrates originated from their own intestinal canals and that they were originally mildly toxic or non-pathogenic inhabitants of the vertebrate alimentary canal.

We know this holds for one human parasite, the amœba of dysentery which being essentially an intestinal organism does find its way into the intestinal wall and then into the liver or brain setting up disease and death.

Certain biflagellate organisms such as *Trypanoplasma* are closely related to intestinal organisms like trichomonads, and it seems probable that these may occasionally pass from the gut into the blood stream of amphibians and may subsequently have adapted themselves to the insect vector and so have ensured transmission from one host to another.

We may regard both these hypothesis to be probable, though we believe that the majority of blood parasites of the higher vertebrates have their origin in the intestinal canal of insects.

Insects which are concerned in the transmission of disease.

We will now make a short review of the arthropod carriers and say something of the diseases they transmit. Our time is much too short to deal in detail with this wide and important subject, but what follows may serve to refresh your memory and to bring home to you what is the object of this address, namely, to emphasise the menace to man and to the domestic animals which is brought about by insect carriers.

The two main divisions of the *Arthropoda* or jointed limbed animals are the *Arachnoida* which include the ticks, mites and spiders—all eight legged,—and the *Hexopoda* including the lice, bugs, fleas, mosquitoes and flies which are all six legged in their mature forms.

The mites which interest us are the *Acarina* such as the harvest mites, and the large group of the *Sarcoptes* which includes the human itch mite, and the many forms of itch and mange and scab mites which attack man or his domestic animals. Harvest mites are tiny creatures which live in vegetation and at certain seasons burrow into the skin of man, giving rise to much urticaria and irritation. One species, the Kedani mite, gives rise to a definite febrile condition called Japanese river fever. Mites are common in some parts of India, but beyond the irritation they cause are not known to give rise to any specific disease.

The itch mites are very widespread and cause much trouble, especially to poor and uncleanly persons, by the production of the disease known as itch. Mange and scab amongst domestic animals are ubiquitous and give rise to exceedingly intractable forms of skin disease. The mites are specific for the hosts they infect and this suggests that they have acquired the parasitic habit at some very remote period of time.

Ticks are creatures remarkable for their longevity, their powers of resistance to adverse influences, and their fecundity. Adults will live unfed for one or even two years, and will resist the action of chemicals and disinfectants which will immediately destroy most other forms of insect life. They pass through a series of moults as they grow from minute larvae to sexually mature adults, and at each feed they fall to the ground and after moulting have to find the right host if development is to be continued. The patience and tenacity of these creatures is remarkable, and they may be seen on a blade of grass or a twig waiting for weeks or months for the right species of animal to pass by. Their immense fecundity is thus explained, for like all living creatures they are prolific in direct proportion to their chances of destruction in an immature stage. The female tick lays anything up to five thousand eggs at a sitting and only a few of these have any chance of attaining maturity. Ticks have specialised in the transmission of a particular genus of blood parasites—the *Piroplasmata*, though perhaps only one of these causes disease in man (Oroya fever). *Piroplasmata*, as far as their life histories have been worked out, are all carried by ticks, and the damage done to domestic stock by Texas fever, red water fever, and similar diseases of cattle is enormous; whilst horses, sheep,

goats and dogs have each their specific *Piroplasma* diseases which are in every case carried by ticks.

The other great family of ticks—the *Argasidae*—transmit a totally different kind of blood parasite—the spirochaetes.

African relapsing fever of man is transmitted by a tick of this family (*Ornithodoros moubata*), whilst epidemics of spirochaete diseases of birds, fowls, geese, and ducks are caused by the ravages of *Argas persicus*, the fowl tick.

A human typhus-like disease met with in parts of the Himalayas is believed to be carried by ticks, and relapsing fever in Persia is said to be caused by species of *Ornithodoros*, but these suspicions remain to be proved.

We pass on now to the *Hexopoda*, the true insects.

Those which concern us as human parasites amongst the *Hemiptera* are the *Pediculidae* or lice, *Cimicidae* or bugs, and the reduvid bugs of the genus *Conorhinus*.

Lice.—Blood-sucking lice are very dangerous parasites of man, for three severe and often fatal diseases are transmitted by them and probably by them alone. The first evidence incriminating the louse as a carrier of specific disease in man was produced in India in 1907 when it was shown that Asiatic relapsing fever was transmitted by this insect. This was verified in Northern Africa and in European countries and this insect is now held to be the chief if not the only cause of the spread of relapsing fever in nearly every part of the world. Shortly after this discovery, typhus fever, a disease closely resembling relapsing fever, was shown to be similarly transmitted. The widespread and fatal epidemics of these two diseases, particularly in Russia and Eastern Europe during and since the war, reveal the deadly potentialities of lice and at the same time have shown the way to prevention by the comparatively simple method of delousing the susceptible community.

A third disease is also louse-borne—trench fever—which gave rise to a large amount of disease and invalidity amongst the soldiers in the trenches during the great war. The cause of this disease is not entirely settled, but is probably due to a very minute polymorphic organism belonging to the genus *Rickettsia*.

Bugs.—These unpleasant insects are too well known to need any description. They have been suspected of transmitting several diseases such as kala-azar, leprosy, relapsing fever, plague, infantile paralysis, but it cannot be said that the case has been proven against them in respect of any of these diseases. Apart from their disease carrying possibilities they are an intolerable nuisance and may produce a condition of ill-health in their victims by disturbing sleep and even by producing anemia by their voracious blood sucking. The *Conorhinus* bug (*C. megistus*) is a large blood-sucking insect which in South America transmits a human trypanosome (*T. Cruzi*). An Indian species, *C. rubrofasciatus*, has been suggested as a possible carrier of Indian kala-azar. It is found in Madras and in Assam—both endemic areas of the disease,—and lives in native huts and occasionally bites men. No further evidence of its transmissive power exists.

Passing on to the large order of *Diptera*, we find the family of *Siphonoptera* which includes the fleas. These insects are particularly notorious in that they transmit plague and their mode of action presents some peculiar features. All the diseases we have hitherto been considering are caused by protozoa, whereas plague is a bacterial disease, and with tularaemia is one of the few bacterial diseases carried by the bites of insects. Again plague is primarily a disease of rats and is only incidentally, almost accidentally, a disease of man.

The plague bacillus multiplies enormously in the alimentary canal of the flea and to such an extent in some insects that a blocking at the entrance of the stomach occurs and in such fleas regurgitation of highly infected material takes place into the puncture, and in this way

the plague bacillus finds its way into the circulation of man.

Fleas are credited with the transmission of relapsing fever, leprosy, etc., but this is unproven. The rat flea, however, is responsible for the transmission of the trypanosome disease of rats, (*T. Lewis*).

The *Sarcopsyllidae* or jiggers are burrowing fleas which infest the skin of the feet and set up severe septic complications; they are not found in Asia.

The Culicidae or mosquitoes.

A true insect carrier or vector is one in which the specific parasite undergoes a necessary part of its life-history, i.e., part of its alternation of generations, in the insect host. The most perfect example of this is the development of the malarial parasite in the body of certain *Anopheles* mosquitoes. This is true parasitism and one must suppose that but for the presence of susceptible human hosts and the appropriate insect carrier, the parasite of malaria would become extinct. It also appears that a meal of blood is necessary to the female mosquito for the maturation of her eggs.

It is interesting to note that of all mosquitoes only the *Anopheles* have learned the evil habit of malarial transmission, and of all the species of *Anopheles* only about a score the world over have been proved to be carriers of malaria in nature. In some others it has been found possible to infect them by laboratory experiment, though in Nature this does not happen. In others, development goes a certain distance and then withers and dies, whilst in the majority of *Anopheles* the malarial parasite does not develop at all. What these profound differences depend on, we know not, but it shows how subtle must be the interaction between parasite and host and it offers hope that this incompatibility may be brought about artificially when once we know its cause.

There are two other important genera of mosquitoes which carry disease but are apparently quite incapable of transmitting malaria. A small worm parasite (*Filaria Bancrofti*), the cause of filariasis and of its sequela elephantiasis, is transmitted by certain species of *Culex*, and dengue is also believed to be carried in the same way.

Yellow fever, the scourge of Central and South America, is transmitted by yet another kind of mosquito, the *Stegomyia*. The stamping out of yellow fever in these countries, where it was epidemic, is one of the greatest triumphs of modern preventive medicine and shows what can be done to eradicate mosquito-borne disease if only expert knowledge, organisation, energy and money are in league together.

We see that mosquitoes are able to transmit four totally distinct diseases:—

- (a) Malaria, due to a blood sporozoon.
- (b) Filariasis, due to a blood nematode worm.
- (c) Yellow fever, due to a blood spirochaete.
- (d) Dengue, a disease of unknown causation.

The family *Simuliidae* includes the sandflies which are concerned in the transmission of the short fever of that name. This disease is never fatal, but gives rise to a great deal of sickness and temporary invalidity in countries like Iraq and in the Punjab where sandflies are prevalent.

Sandflies of the genus *Phlebotomus* are suspected of being concerned in the transmission of parasites of the herpetomonad or Leishmania type.

Flagellates of this nature were found by Wenyon in 1912 in Aleppo, an endemic centre of oriental sore, and in 1914 by me in an endemic centre of kala-azar in Assam.

In 1921 the brothers Sergeant and others incriminated species of *Phlebotomus* as transmitters of oriental sore in Tunis, and just lately the Calcutta workers and the Assam Kala-azar Commission have brought evidence to suggest that these insects may be concerned in the spread of kala-azar.

It appears probable that the flagellates found by Wenyon and by me were in reality developmental

forms of the *Leishmania* parasites rather than natural flagellates which they were provisionally considered to be. Papers are being contributed to this discussion bearing on this interesting problem, and further developments are awaited with great interest.

The Muscid flies include many species which are or may be noxious to man. Such are the common house fly, the stable fly (*Stomoxys*), the various kinds of "blue bottles" which lay eggs in dead or damaged human tissues, the *Tabanids* or gadflies, *Hæmatopota* and *Chrysops*, and most important of all—the tse-tse flies.

The common house fly on account of its dirty habits is an undoubted transmitter of disease, for the germs of enteric fever, dysentery, cholera and other intestinal diseases have been found in or upon it. An experimenter in America found that out of 414 house flies an average number of one and quarter million bacteria mostly of fecal origin were found on the outside of the flies. The fouling of milk and other articles of food is thus easily explained. There are various species of "blue bottle" flies,—*Lucilia*, *Sarcophaga*, *Oestrída*, and others which lay eggs in diseased human tissues. Larvæ or maggots are produced and these live on the dead matters of the wound and give rise to much suffering and mutilation. It is interesting to note that the larva itself of one of these flies has developed the blood-sucking habit. This is the Congo floor maggot—the larva of *Auchmeromyia luteola*. This creature lives in cracks in the floor of native huts in Central Africa and emerges at night to visit sleeping human beings. It burrows under the skin, takes its fill of blood and returns again to the ground to digest its meal. It has taken to nocturnal habits and acts almost exactly like the human tick (*Ornithodoros*) with which it lives side by side, an interesting example of convergent evolution in two totally distinct types of creatures.

Of the blood-sucking muscids, the tabanids and *Hæmatopota* are carriers of disease amongst domestic stock both in India (Surra) and probably also in Africa.

One species of the genus *Chrysops* transmits a worm parasite in human beings—the filarial parasite *Loa-loa*.

Tse-tse flies.

Flies of the genus *Glossina* or tse-tse flies are responsible for an enormous amount of disease in tropical Africa due to trypanosome infection.

Two species of trypanosomes affect man, giving rise to sleeping sickness of the Congo and Uganda type or of the Rhodesian type. In addition to these there is an immense amount of damage to domestic stock, cattle, horses, sheep, by trypanosomes of different species which are all transmitted by tse-tse flies. The interesting point about these diseases is that the infection exists in the wild game which live in these countries from which the tse-tse flies get their infection and which represent natural reservoirs. This is an example of what we were saying before about racial and hereditary immunity; the antelopes and other wild game are immune to these diseases, which assume epidemic form in man and his domestic animals in which no such immunity exists.

I well remember an impressive example of this which occurred in Uganda. An antelope was caught on the lake shore and kept in captivity for many months in a perfectly healthy state. Its blood was examined daily for months, but no trypanosomes were ever seen. Batches of newly bred tse-tse flies were fed on the antelope and after a suitable interval were fed on a susceptible animal, a monkey. Every batch of flies fed on the antelope were shown to be infected with sleeping sickness, the antelope therefore being a healthy carrier or reservoir of sleeping sickness. The tse-tse fly being the natural vector had the power, so to say, of filtering out of the blood the infective trypanosome which was so scarce as never to be seen with the microscope.

I have now said enough to impress upon you the importance of the study of insect life and shown you how

the well-being of tropical communities will be affected by such studies.

If this were all it were important enough, but there is the added interest of the purely scientific side of such studies to emphasise the importance of the little things in life; for though they are small and frail and simple in construction, these insects carry within them the secrets of life, no less than do the large and more complex animals.

When one looking down a microscope sees an amoeba creeping out of dead matter and proceeding on its way in the exercise of its simple functions, one is reminded that this is the very life plasma which one sees in all its nakedness, this is the very fashion in which life emerged from chaos at the dawn of time, and that within this small creature are hidden the eternal mysteries of life and death.

Tennyson clothed this idea in poetic language when he wrote:—

"Flower in the crannied wall,
I pluck you out of the crannies,
I hold you here, root and all, in my hand,
Little flower—but if I could understand
What you are, root and all, and all in all,
I should know what God and man is."

The application of the knowledge to the prevention of disease.

Having now considered briefly some of the theoretical aspects of the problem of disease transmission by insects, it behoves one to say how our knowledge on the subject can be applied to the betterment of public health. We have seen from the statistics that insect-borne disease is an enormous burden on the financial, economic and social conditions of the Indian people, and you will agree that a policy of drift or an attitude of fatalism cannot be longer tolerated. India, like other Eastern countries, is awakening from her long slumber and this immense fatality from preventable diseases is one of the most important problems which she has to face.

Now that she is at the turning of the roads, it is of great importance that her steps be guided aright, and she must be shown how necessary it is to pay more attention to problems of public health. The unhealthiness of the tropics and sub-tropics is not a question of heat or humidity or such physical states, but is due almost entirely to the diseases which these conditions foster, so that if we rid India of these insect-borne diseases, we should go far to bring her mortality into line with that of temperate countries.

The first essential before we can make much advance is to convince our legislators, our officials, and, most important, the population at large, of the importance of preventive as compared with curative medicine.

Public opinion in most countries is entirely wrong in its estimate of the relative importance of these two aspects of medical science, though of recent years the more enlightened countries of the West are beginning to revise this estimate. The effect of curative medicine on public health is relatively trivial compared with that to be expected from a rational application of preventive medicine.

Yet the panacea for the high mortality in a district is to provide more hospitals or dispensaries, without pausing to consider whether disease will be reduced by so doing. Hospitals are of course quite essential and the personal treatment of the sick is taking and always will take a high place on grounds of humanity; but if we wish to reduce the mortality from epidemic or transmissible diseases, it will not be by building hospitals only, but by spending at least a part of the available money on preventive measures.

To expect to stamp out malaria by curing some of its victims is as unreasonable as to suppose that when one draws water from a spring one is thereby reducing the underground supply by which the spring is fed. Disease is welling up all around us, constantly or intermittently, the laws which govern its rise and fall are

almost unknown, but the treatment of it is ever necessary it may be, cannot be necessary for the more rational procedures of the sanitarian.

Most of the great discoveries of our science in the last century have been in prevention rather than cure. Take for instance, the prevention of small-pox by vaccination, the reduction of typhoid fevers by inoculation, the prophylaxis of tetanus by serum, the prevention of sepsis by Lister's discoveries, and even the prevention of pain by anaesthetics.

I will go further and say "*transmissible diseases will never be abolished by curing, but only by preventing them.*" This truth finds popular expression in the saying, "Prevention is better than cure," a proverb that has lost the profundity of its truth by its very triteness.

The lowering of the death rate, especially of the infantile death rate, the increased expectation of life, and the general increase of healthiness which have been brought about during the last half century in the more civilised countries of the West, have been caused not so much by the success of curative medicine but almost entirely by the triumphs of prevention.

One of the most amazingly retrograde steps which has resulted from our recently acquired methods of legislation is the demand from one province after another for the abolition of Public Health Commissioners and the weakening of the services they control. That politicians should be found so short-sighted as to try to weaken the very organisation on which the whole health and future prosperity of India depends, causes one to lose faith almost in the future of human progress.

If adequate measures are to be taken to deal effectively with the vast subject of preventable disease, it must be by strengthening and not by weakening the public health services. We look, and we believe, not in vain, to the supreme Government to stand four square against this rising tide of ignorance and prejudice.

It is our duty, when the time comes, to hand over the Government of this country to its own population, to see that we leave it with a strong, well organised, and efficient public health service; and that, I believe, is the greatest boon which Western medical science can confer on India.

If the exponents of medical practice in India decide to revert to those "ancient shibboleths of a creed outworn," which we know as the indigenous systems, and to return to the "golden age" of the Rishis, I think it will do less harm than the disastrous state of affairs which will result if the modern principles of hygiene and sanitation are allowed to wither away and to pass into forgetfulness.

The results of research into the causation of tropical diseases are well known to all of you, and if you wish to refresh your memory on this subject, you cannot do better than re-read the presidential address given two years ago at this section by my distinguished predecessor in this chair, Major H. W. Acton, I.M.S. "Research cannot be allowed to end in the laboratory, it is useless unless its principles are brought into actual practice; for only then does it come to full fruition. The difficulty is to bridge this gap which exists between the two."

Research has forged powerful weapons, and has placed them in the hands of sanitarians; but for various reasons, chiefly for lack of funds and from ignorance, want of co-operation or passive resistance on the part of the people, these weapons have not been given a fair chance. It is for an improved and strengthened Public Health Service to use these weapons, to transfer the results of research into the campaign against disease, and so to point the way to the reduction of the vast amount of preventable disease under which India is groaning.

One way in which this may be effected is by closer co-operation between the Medical Research Department and the Public Health Service. The principal laboratories in the country should be provided each with a

mobile laboratory unit whose function should be to proceed at once to the site of any outbreak of disease and ascertain its causation. The nature of the epidemic being known, the official in charge of the unit may consult with the local sanitary authorities as to the best measures for limiting or stamping it out. This principle was acted on with great success during the war in many parts of the world, and it should prove of no less value in peace. Such a unit has been started already in Madras and has already proved its usefulness.

In order to emphasise further the importance of the subject of insect-borne disease, I have arranged a combined discussion by the Sections of Agriculture, Botany and Medical Research, which will be still further strengthened by the presence of experts in Veterinary Science. The subject of discussion is entitled, "Insects and their relation to the diseases of man, animals and plants," and will be, I am sure, a source of interest and profit to all concerned. It will emphasise also the interdependence of these various sciences in the war against tropical disease and the valuable results which may be expected from co-operation of the experts who each in their own department are faced by similar important problems.

In conclusion, if we want a motto for our standards in the war against noxious insects in the tropics, we cannot do better than take the one used by our King-Emperor on a similar occasion: "We speak of preventable disease, but," he added "**IF PREVENTABLE, WHY NOT PREVENTED?**"

At a combined meeting of the Agricultural, Botanical, Zoological and Medical Research Sections of the Indian Science Congress which took place at Benares on Thursday, the 15th January, 1925, the following proposal was put forward by the President of the Medical Research Section (Lieutenant-Colonel F. P. Mackie, I.M.S.):—

"In view of the close association between the diseases of man and of domestic animals, the members of the Medical Research Section of the Indian Science Congress would welcome the inclusion in their section of scientific workers in Veterinary Science, which inclusion would be to the mutual advantage of both aspects of pathology. The Section would then be known as 'The Medical and Veterinary Research Section.' This suggestion has the strong support of prominent members of the Indian Civil Veterinary Department."

Mr. J. T. Edwards, Director of the Imperial Civil Veterinary Department, Muktesar, seconded the proposal in the following words:—

"It accorded with the wishes of Veterinary authorities in India, who were sensitive of the compliment paid to them by this welcome to the meetings of their distinguished sister profession at the Congress. They did not desire it to be thought, however, that they wished to desert the Agricultural Section or to dissociate themselves in any way from the agricultural interests of the country by taking this step. In fact, the endeavours of veterinary workers must always be directed to obtain results of economic value to agriculturists, and the problems of animal husbandry were of common interest to both. On the other hand, it was now generally recognised that the problem of disease, whether it be in man, animals, or plants was one and indivisible, and in order to make advances in this field of study it was necessary to have the co-operation of workers engaged in all parts of the field. It therefore seemed that amalgamation with the Medical Section would be more likely to elicit discussion of veterinary contributions from trained workers in the pursuit of research into disease. Veterinary research had the advantage over pure medical research of revealing disease phenomena from the comparative standpoint; manifestations that were obscure in one species sometimes when revealed, in the same or a different species. Again,

investigation could be pursued to greater logical perfection, by the inclusion of the natural host itself in the system of experimentation. Otherwise, veterinary workers stood to gain from the more exalted contributions to knowledge of the medical investigators, who possessed in their ranks much larger numbers of highly trained men and prosecuted their studies ordinarily with greater precision, considerations which seemed to be dependent upon the relative financial (or perhaps, often, sentimental) worth of the subjects of study of the two classes of workers."

Mr. R. S. Finlow, President of the Agricultural Section, added the following remarks:—

Speaking on the resolution Mr. Finlow said that as President of the Agricultural Section he considered that the arrangement arrived at should be that which would best serve the object in view, i.e., the interests of the country at large.

Having in view the series of papers mentioned by veterinary workers to the Agricultural Section this year, it would seem that they might preferably have been read before the Medical Research Section. Therefore although the Agricultural Section would deplore the cry of the veterinary delegates, it could only in the general interest agree to the proposal.

Mr. Finlow added that there would undoubtedly be cases where papers by veterinary delegates would be of such a nature that it would be more suitable to read them before the Agricultural Section. He suggested that this be kept in mind and that due discrimination be exercised by veterinary delegates in apportioning their papers.

The proposal was then put to the combined meeting and carried unanimously. It was resolved to submit the resolution to the Committee of the Indian Science Congress.

At a meeting of the Medical Research Section of the Indian Science Congress on Tuesday, January 13, 1925, the attached proposal was made by the President of the Section (Lieutenant-Colonel F. P. Mackie, I.M.S.) and passed. It was further resolved to send this proposal to the Government of India.

"That the members of the Medical Research Section of the Indian Science Congress now sitting are of opinion that, in view of the vast amount of epidemic and endemic parasitic disease in India, the Government of India and the local Governments should be urged to enlarge and strengthen the Public Health Service throughout the country with a view to reducing the enormous amount of invalidity and death resulting from preventable disease." Proposed by Lieutenant-Colonel F. P. Mackie, I.M.S. The proposal was seconded by Lieutenant-Colonel F. H. G. Hutchinson, C.I.E., I.M.S., A.D.M.S., Allahabad, lately Public Health Commissioner with the Government of India, in the following words:—

"Mr. President, The logical sequence of your interesting and inspiring address is the resolution you have placed before us. You have mentioned the proposals for the reduction of the Public Health Department which arose in connection with the cry for economy. It is not surprising that these proposals were made, for Government action is mainly the reflex of public opinion; not wholly so, for such action should in part aim at creating that opinion. How is it that in the face of some four to six million deaths in a year from preventable diseases in British India, public opinion in favour of prevention of disease practically does not exist. It is obviously the result of a widespread ignorance of what can be done. The importance of this is evident in consideration of the two forces underlying all action for the prevention of disease. The first force is fear or the instinct of self-preservation; this has acted since disease first came into the world, but no permanent advance has resulted therefrom, because its influence is short lived after the calamity which gave it birth. The second force is humanity, the spirit of true humanity which cannot see suffering without the desire to alleviate it. This force has been responsible for the enormous advances in the

prevention of disease made by many countries in the past half century. If this force in relation to disease be dormant in India, it is due to the fact that people do not realise what can be done.

It is by research; by the application of the knowledge gained thereby; by the practical demonstration of the value of such application that this force of humanity will be awakened. The people of India will then cry out in the words of the late King Edward which you have just quoted—"If disease be preventable, why not prevented?" Your resolution, Sir, points the way to the means by which the arrival of that day will be accelerated, and I esteem it a privilege to second it."

The proposal was put to the meeting and carried unanimously.

PUERPERAL SEPSIS. ITS DIFFERENTIATION AND TREATMENT.

A CLINICAL LECTURE TO POST-GRADUATES.

By V. B. GREEN-ARMYTAGE, M.D., M.R.C.P.,

MAJOR, I.M.S.,

Second Professor of Obstetrics and Gynaecology,
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GENTLEMEN,—I have asked you to meet me to-day in the Septic Block, because chance has so arranged that I can show you typical examples of those different kinds of puerperal infection which, in one way or another, may become a nightmare to you later on. For in general practice, unless you have a clear conception of the various clinical types of puerperal sepsis, your diagnosis, prognosis, and treatment, will be slipshod, haphazard, and 'shot-gun' like.

Puerperal sepsis is extremely common, and until we can instil *ante-natal* care, cleanliness, and non-meddlesome midwifery, into the old women, nurses, and doctors of this world it will remain so; but please do not run away with the idea that it is necessarily a fatal disease, or that the diagnosis is simple, and the treatment 'rule of thumb.' It is nothing of the sort. Every case is of extreme interest and will test your clinical acumen to the utmost; moreover, please remember in these conditions that your prognosis must not be an immediate one, but that you must think of the remote complications and sequelae.

Before I talk to you of these cases I have collected, perhaps you will let me remind you that, however difficult it may be, prevention is better than cure, and that those scrupulous *ante-natal* and prophylactic measures which every teaching hospital uses in its labour room must be observed in general practice.

Rule No. 14 of our labour room runs as follows:—

"Staff nurses, students, and house staff will please remember that patients with labial affections are not to be examined unless urgently necessary, and that the responsibility of examining such a case must lie with the resident surgeon. This includes such conditions as sores, warts, ulcers, pus discharges, growths, boils, and pustules."

For example let me show you these two cases. One is a lady who was confined outside with forceps, of a baby which died shortly after delivery, and you will see that she has soft sores on the labia, with a sloughing vagina and perineum, complicated by high fever and a discharge in which the gonococcus has been demonstrated.

The other is a full-term patient with an elephantoid condition of the labia majora and ulceration of a granular type of the labia minora.

Speaking gynaecologically, may I remind you that this condition of the vulva we used to think was due to filariasis; now we know that in the majority of cases it is of syphilitic origin. In a lesser number of cases it may be due to tuberculosis or to Leishmania infection. How will you conduct labour in such a case?

First let me remind you that the cervix and upper third of the vagina are potentially sterile; therefore let me

adjure you not to examine or apply forceps, for if you do you must carry organisms up into the cervix and uterus. If, however, when the head is low down on the perineum assistance should become absolutely necessary, greatly as I dislike it, I believe pituitrin is the best drug to use, and anyhow is safer than forceps. Indeed, I think it is better to perforate the head with a pair of scissors (*faute de mieux*) than to apply forceps in such a case, for, if the head tears the vagina or lacerates the perineum of these patients, organisms attack the raw surface and the patient frequently succumbs to septicæmia.

Half the battle of the prevention of puerperal fever is the proper management of the first, second, third, and fourth stages of labour.

By this I mean, that during the first stage the bladder and rectum should be kept empty, unnecessary vaginal examinations should not be made, and absolute cleanliness taken as regards hands and skin,—and here perhaps you will allow me to say that every patient in private practice or hospital should be shaved.

As regards the second stage of labour, if you permit it to be too long there is grave danger of the vagina, cervix, and perineum sloughing. Indeed, in this lecture I want to impress on you that half the puerperal patients you will see in Bengal are suffering from one or other of the above conditions.

It may perhaps help you if you will remember a practical rule of mine, i.e.—For an L. O. A., second stage, allow two hours. For a breech presentation, second stage, allow three hours. For R. O. P., four hours; and for a face presentation, 5 hours.

As for the third stage, you must see that the placenta and membranes are intact, and that nothing is left behind.

N.B.—If the perineum is ruptured it must be sutured, but if the case is septic the perineum should never be sutured.

The fourth stage may need an explanation, but it is the term I like to use for the period from the expulsion of the placenta until the tenth day. In this stage it is your duty to promote drainage of the lochia by postural treatment. Quadrupeds rarely suffer from puerperal fever, or lochiametra, because Nature has so arranged that the line of drainage shall be from above downwards and out; but among European patients who lie on their backs for ten days or more, or who sit up in bed to nurse their babies, the heavy, and perhaps flabby uterus, tends to drop backwards, with the result that there is a kink at the internal os, the lochial discharge is retained, and this gives rise to fever.

If you will remember this, and will ask the puerperal mother to lie on her face for 8 hours in every day, you will promote drainage and avoid the anxiety of that low fever due to lochiametra; moreover, if you will adopt this postural treatment which imitates that of the quadrupeds, you will find that your patients will not complain, when they get up and about, of that feeling of "their insides coming out"; for this feeling is merely due to the fact that the heavy, retroverted (and possibly sub-involuted) uterus, lying in the line of the vagina, tends, when the patient stands, to bulge down through the recently stretched and torn pelvic muscle and fascia through which the baby has recently passed out into the world.

The following are the common varieties of puerperal sepsis:—

- (i) Staphylococcal infection.
- (ii) Streptococcal infection.
- (iii) *B. coli* infection.
- (iv) Mixed infection, i.e., either (a) Streptococcus, (b) Staphylococcus and *B. coli*, or all three together.

Case No. I.—Look at this lady; she is a typical example of a staphylococcal infection, and some of you may remember when she came in that she had had, as you will see from the chart, a temperature of 102° to 104° for the previous two weeks. I informed her relations that she would recover

On what ground? was such an assumption based?

1. The history of a long first and second stage of labour, followed by a story of stinking vaginal discharge, pointed to the fact that the cervix and vagina were probably torn and infected with staphylococci which are particularly prone to infect bruised tissues; and those of you who were not here at the time must take my word for it when I tell you that the cervix was torn and of a greenish brown colour, and the discharge very offensive.

2. The slow onset of fever. The temperature, you will see, on the second day was 100°, on the third 101°, on the fourth 102°, after which it ranged between 103° and 104°, and is now subsiding in her fourth week.

3. The pulse was not very rapid.

4. The patient did not look very ill, i.e., she did not wear an anxious expression, nor was there marked anæmia. You will see that now the eyes are bright and the tongue fairly clean after 30 days of fever.

5. The abdomen is not distended nor rigid, though there is slight tenderness on pressure above the pubes.

The Pathological Department found pure *Staphylococcus albus* in her blood, and, despite the fact that her temperature has lasted 34 days, at no time has one felt anxious as to her eventual recovery (although once her relations were far from being so optimistic); but when she completely recovers, by virtue of the treatment we shall speak of later, they will be delighted when I tell them that her chances of future child-bearing are not necessarily jeopardized, for she has been suffering from an infection of the cervico-vaginal cellular tissues and not of the peritoneum, and therefore there is no block or closure of the connection between the ovaries, tubes, and uterus;—a very important point in prognosis which is very often forgotten.

Another interesting fact about this case is that we have been able to isolate the *Staphylococcus* from the urine as well.

Case No. II.—Now come to this bed and look at this girl who is not going to die of a streptococcal infection, despite a nine days exhaustive battle with her disease since she was admitted.

Her history will tell you that within a few hours of labour she had a rigor. This temperature chart will show you the rapid pulse and respirations, and the large oscillations of the temperature during the week she has been here. You will see for yourself the anxious expression, acute anæmia, and sore tongue. The abdomen I will uncover for you and you will see how it is distended, tender, and rigid, because the uterus is infected and the organisms have passed through the wall of the relaxed uterus to the peritoneum, producing peritonitis. The sister-in-charge tells me that she has diarrhoea, but the lochia are not offensive. The Pathological Department report *Streptococcus hemolyticus*.

The picture is complete, and it is certain that some hand or instrument has transmitted organisms through the vagina to the uterus and thence these have passed to the peritoneal cavity and general circulation. Whenever you see a case of puerperal fever with acute anæmia, sore tongue, diarrhoea, and distended abdomen, you may be sure it is a streptococcal infection.

The prognosis in this case fortunately is not hopeless, as, thanks to the modern treatment of which I shall speak later, she will now recover I think.

Case No. III.—Now gentlemen, will you come with me and see this Jewish lady. She is a typical case of *B. coli* infection. You will observe that she gives a history of slight fever before the baby was born (not that that is always so), but please note that the onset of the fever was acute. The temperature chart in a *B. coli* patient is almost typically like our cathedral steeple, that is, it is a spiked chart, up and down, though rigors are not common.

Look at this lady's tongue and feel her pulse. You will see that the one is clean and the other is slow. Her eyes are bright, and there is no anxiety in their expression. There is no marked anæmia and no

diarrhoea. The abdomen is flatulent but not tender nor rigid. There is slight pain when I press hard in the right loin due to pyelitis. The urine, you will see, is of a curious opalescent sheen, and the Pathological Department report "numerous colonies of *B. coli*."

If these cases are more severe than this one, they look exactly like a typhoid case and last for weeks, but they rarely die.

Case No. IV.—Now I want you to come with me into this private room quietly, look at the patient and go out at the opposite door.

This is a patient who was admitted two days ago after being examined and messed about with for days outside. The baby was dead and craniotomy was performed here, but unfortunately she has a mixed infection of *Staphylococcus aureus* and *Streptococci*.

You will observe that she is unconscious, her pulse is 140, and her temperature 105°. The abdomen is distended, rigid, and tender, with peritonitis. She is dying. The case is one of fulminant infection, for before the blood and lymph sinuses closed, virulent organisms had passed into the general circulation and peritoneal cavity. Long labour and the exhaustion of repeated pregnancies have robbed her of all resistance, and, unfortunately, no treatment will be of avail.

Case No. V.—Finally, let me show you this case in the corner. Here we have a girl aged 16, who had a retained placenta following a long and difficult labour. That placenta was removed manually seven weeks ago, and, contrary to my own teaching, after its removal an intra-uterine douche was given.

If you will look at this case carefully; you will see that she has obviously come through a very long illness. She is thin, anæmic, and extremely weak; and if you will place your hand upon the abdomen you will feel, stretching from the anterior iliac spine to the middle line, a stony hard infiltration; and immediately above Poupart's ligament you will see there is a sinus which leads down into the pelvis for a distance of 4½ inches. The pus from this sinus grew streptococci and *B. coli*. She will recover, but what I want you to realize is, that in removing the retained placenta in a patient who is already septic, there is always the grave danger of organisms which are in the uterus being rubbed in, or grafted into, the raw surfaces.

In this particular case there is a long lateral tear of the cervix leading up to the internal os, which communicates with the cellular tissue of the broad ligament; the leaves of this ligament have been separated by an enormous inflammatory phlegmon, which not only stretches up to the anterior iliac spine, but which also surrounds the rectum, urethra, and the top of the vagina, encasing them as if in plaster of Paris. She will recover, but later she will probably have some stricture or deformity of the urethra, vagina or rectum. These cases of phlegmonous inflammatory exudate are nearly invariably streptococcal in origin.

When I was a student, it was taught, and thought that strictures of the urethra, or vagina, or rectum, were always post-gonococcal in origin, but, seeing how common these conditions are in Bengal, following a history of puerperal fever, I am sure that this is not so, and that such strictures are secondary to streptococcal cellulitis and its subsequent fibrosis.

Only a very small percentage of these inflammatory streptococcal exudates break down and form abscesses.

Now, gentlemen, you have seen these cases. May I then remind you, in view of the different types of puerperal sepsis, of the questions and observations which it is absolutely imperative that you should comply with in any case to which you are called?

1. Enquire as to the history of the labour, whether it was long or not. Whether instruments were used or not; and how long did the first, second, and third stages last?

2. Whether there was any local disease or discharge before the baby was born, remembering the possibility

that the husband may have suffered from venereal disease.

3. Enquire carefully about the placenta and membranes, whether they were intact; also as to the perineum.

4. As regards the fever, make a careful mental note as to whether; (a) the onset was gradual or somewhat deferred, thereby giving you a suggestion that there is retention of lochia; (b) the temperature is high without rigors—suggesting that the fever is due to a staphylococcus infection of a bruised or sloughing cervix and vagina; (c) the onset was acute with rigors—suggesting a streptococcus infection; (d) the temperature is 'steep-like'—suggesting *B. coli* infection.

5. Observe the expression of the face and eyes, noting carefully whether there is anæmia, or no, and whether the tongue is clean, typhoidal, or sore.

If there is acute anæmia, and the tongue is red and sore, and the pulse very rapid, these cases are always due to streptococci and are of the worst prognosis. On the other hand if the tongue is clean, the eyes bright, and the expression not anxious, then it is as a rule a case of *B. coli* infection.

If the tongue is typhoidal it is probably staphylococcal or a mixed infection.

6. Never forget to expose the abdomen and observe whether there is pain, rigidity, or distention. Generalized pain and rigidity, especially if it be accompanied by distention above the umbilicus, is nearly always of streptococcal origin. If the tenderness and distention be below the umbilicus, and the uterus be palpable, the probabilities are that the infection is with the *Staphylococcus* or *B. coli*.

7. Next enquire carefully as to the discharge, whether there is any smell. If so it is nearly certain that it is due to staphylococci or *B. coli*. If there is no smell, the probabilities are that it is a streptococcus infection.

8. Enquire about a catheter specimen of the urine. Whether it is clear and acid—suggestive of *B. coli*. Whether it is concentrated or highly coloured, suggesting *Staphylococcus*. Whether it is smoky, indicating acute nephritis secondary to streptococci.

TREATMENT.

1. The commonest cause of all fevers after childbirth is, I think, *lochia metra*, due to a clot, or membrane, or kink (caused by a falling backwards of the uterus), damming back the natural discharge.

The treatment of this condition, as I have already pointed out when speaking of the patients I have shown you, is:—(a) *Postural*, i.e., making the patient lie upon her face, or in Sim's position, for eight hours out of the 24. (b) Hot vaginal douches four-hourly. (c) Hot rectal saline douches b.d. (d) Ergot and pituitrin. In most cases this is all that is necessary. If the low fever does not subside, or recurs, then merely putting a gauze or tube drain into the uterus is sufficient.

2. The next most common cause of high fever is undoubtedly a *Staphylococcus* infection, caused by a sloughing of the cervix, vagina, or perineum after a long labour. The treatment of these cases is:—(a) Prop the patient up in Fowler's position and give four-hourly vaginal douches, and hot rectal saline douches b.d. (b) A mixture containing potassium citrate and bicarbonate of soda; for many of these patients have a nasty habit, if the fever continues long, of complaining about the seventeenth or eighteenth day of severe pain in the leg or thigh, and the next morning you find they have phlegmasia alba dolens (white leg). I think the above given in big doses, or citric acid gr. 20, t.d.s., lessens the chances of such occurrences. I, myself, am a great believer in hot rectal douches for these cases.

N.B.—Never give an intra-uterine douche, for the nozzle passing through the septic vagina and cervix carries organisms into the uterus which may directly infect its walls.

Indiscriminate intra-uterine douching is, in my opinion, a most disastrous procedure, for I have records of

over fifty cases where rigors or generalized infection occurred subsequent to this operation; for, as I have previously demonstrated to you, the pressure at the Budjn or Bozeman nozzle from the raised douche can be equal to seven pounds to the square inch. Hence you can easily gather how this pressure tends to push the germs into the lymph or blood sinuses when there is a raw, or jagged endometrium present in the relaxed uterus; to say nothing of the fact that in miscarriage cases the uterine ends of the Fallopian tubes are patent till the sixth month, and so the douche pressure may carry organisms directly to the peritoneal cavity.

3. Next in order of frequency are those cases where there is a history of *bits of membrane and placenta left behind*.

Our researches here prove that in these the puerperal sepsis is nearly always staphylococcal, and my own opinion is that Professor Watson of Edinburgh sounds the correct alarm when he advocates almost complete non-interference.

My own practice is as follows:—

If I know that a large piece of membrane, or I suspect a portion of the placenta, the size of a dry walnut, to be still retained and adherent (as in a recent case you saw), I cover the ends of a pair of sponge-holding forceps with sterile gauze and use this for investigation purposes. I find that these forceps thus dressed make a most adequate remover of bits, for no mere man's finger covered with gauze can explore or reach to the top of a recently parturient uterus. If, on the other hand, I suspect only shreds or small portions of membrane and placenta to be retained I do *not* explore but treat her in exactly the same way as I have told you for lochiametra.

The principles of your treatment should be:—

(1) *Never* give an intra-uterine douche, for the reasons I have given you above.

(2) *Never* curette, however blunt your instrument.

Order:—(a) hot vaginal douches every four hours, and hot rectal douches twice daily; (b) ergot and pituitrin; (c) sit the patient up in Fowler's position, and let her lie in Sim's left lateral position, or on her face, for eight hours daily.

If you suspect from the celerity of the pulse that there is a blood infection, a blood culture should be made.

4. As regards *streptococcal infections*.

These are the gravest of all, but what I want you to realize to-day is, that, thanks to the Gordon Luker technique in private and in hospital practice, we are now able to reduce the mortality. The last five cases of *streptococcal infection* I have seen in consultation have been extremely severe ones, and happily, despite the usual pessimism on the part of the practitioners, have all recovered; and in three of the cases streptococci were found in the blood.

Dr. Gordon Luker advises: (a) 30 c.c. of anti-streptococcal serum hypodermically for three consecutive days at whatever stage of the disease you may see the patient. At the same time five grains of quinine hydrochloride are given intramuscularly into the buttock every other day for six to ten days. In very severe cases he gives the quinine intravenously.

As regards this technique, there is just one more point, and that is, that the quinine solution must be massaged into the tissues immediately after injection in order to prevent local necrosis. (b) Sit the patient up in Fowler's position and give rectal saline. (c) If an autogenous vaccine can be prepared, so much the better.

When working on this subject here between 1910 and 1914 I found, post mortem, that in a large number of these cases there was a big collection of thin ichorous fluid in the pouch of Douglas. I still think, now, as then, that where you suspect such fluid on vaginal examination, it should be evacuated by a posterior colpotomy (Pryor's operation).

These cases of *Streptococcus* infection need most careful nursing, and large quantities of stimulant are necessary, for frequently the patient dies of cardiac toxæmia. Since the War I have been giving in very severe cases intravenous injections of tincture of iodine, 10 to 15 m. doses in a like quantity of sterile water every day. I am afraid I cannot tell you how it acts, but I am perfectly certain it is of great benefit in many cases. My impression is that the iodine stimulates the thyroid gland, for I have noted that this gland has become more swollen subsequent to the injections. As you know, I look upon the thyroid gland as the sparking plug, or detoxicator of the system. Perhaps the iodine whips the gland into action out of the coma caused by the infection. Recently I have been reading Vine's book on the parathyroids and I am inclined to think that, where the above methods have failed, parathyroid extract given in one-tenth grain doses may be another weapon of offence against streptococci, for it raises the leucocyte count.

5. *B. coli* infections are not uncommon, and as a rule do not give rise to any great anxiety beyond the fact of the fever, for the patient herself hardly seems to realize that she is ill. Her tongue, her face, her eyes, her pulse, her belly, all should give you the clue. The finding of leucocytes in a limpid acid urine may help you where a bacteriologist is not at hand. All that you do in these cases is to saturate the patient for 3 to 5 days with three-hourly doses of the following mixture:—

| | | |
|--------------------|----|-------|
| Sodium Bicarbonate | .. | 1 dr. |
| Potassium Citrate | .. | 1 dr. |
| Water | .. | 1 oz. |

In nine cases out of ten the fever will subside, but beware of relapses.

My experience is, that if you keep a patient on this prescription for a week, and then for another week on

| | | |
|-----------------------|----|---------|
| Urotropin | .. | 10 grs. |
| Ammonium Benzoate | .. | 15 grs. |
| Acid Sodium Phosphate | .. | 20 grs. |
| Water | .. | 1 oz. |

t.d.s.

your anxiotics will cease. At the same time the patient is given vaginal douches four times a day, and rectal douches b.d.

Where I have thought the infection was mixed with staphylococci I have given tincture of iodine intravenously as before.

If an autogenous vaccine is procurable, give it in progressive doses commencing with fifty million.

PROGNOSIS.

1. Hitherto pure *Streptococcus* infection has caused an eighty per cent. mortality in this hospital. I hope now, both in Calcutta and in the mofussil, that this mortality will be greatly reduced by the methods I have indicated, for Dr. Gordon Luker has reduced the mortality at the London Hospital to approximately thirty per cent.

2. *Staphylococcus* and *B. coli* infections. These rarely cause the death of a patient, but, consequent to the debility and secondary anæmia of sepsis, many of these patients develop some inter-current disease, such as pneumonia. Others develop multiple arthritis, and some of you may remember a typical case which I showed you recently of a girl who had an ankylosed elbow joint, and a flail-like hip joint with such grating that you could hear this at five yards distance when I moved the head of the femur against the osteophytes around the acetabulum. The history was that she had had three months fever following the birth of a dead baby. She is pregnant again with a markedly contracted pelvis and cicatricized vagina and cervix. I am going to do a Cæsarean section. Other patients develop localized abscesses which run a very distressingly long course. There is a patient in the European Surgical Ward who

has had up to date eleven deep muscular staphylococcal abscesses opened subsequent to a long labour.

Please do not forget that if the patient develops inflammation of the peritoneum, which involves the tubes and ovaries, she is likely to become a chronic invalid and suffer from sterility. Indeed, perhaps the commonest cause of one child sterility in Bengal is just such a condition; whereas if all the symptoms and signs point to an extra-peritoneal phlegmonous exudate (i.e., an infection of the broad ligament or tissues around the vagina), that patient, when she gets well, is capable of conceiving again because the tubes and ovaries were not necessarily involved in the original inflammation. This, you will clearly realize, is the reason why, despite a long history of puerperal fever (such as in the case of the girl I have just mentioned), one frequently hears that a patient is pregnant again.

Unless, therefore, either clinically, or from the history you are absolutely certain that the pelvic peritoneum is, or was, involved, do not give either an immediate or remote bad prognosis.

3. *B. coli* infections, as I have told you, are very liable to relapses and this, coupled with the fact that the fever goes on for a very long time, frequently cause them to resemble typhoid fever.

Please therefore remember that unless your treatment is adequate your patient may suffer from chronic inflammation of the kidneys, bladder, or possibly gall-bladder.

It is of importance to remember that on microscopic examination of a catheter specimen of the urine in cases of puerperal sepsis, one may occasionally obtain a pure growth of staphylococci, which is the cause, or clue to the cause, of the prolonged fever.

Current Topics.

The Wasting Infant.

By ROBERT HUTCHISON, M.D., F.R.C.P.

(British Med. J., May 17, 1924, p. 847.)

WASTING may have different causes.

Organic Disease.—Tuberculosis is not common during the first six months of infancy, when wasting usually occurs. Nor it is likely to occur without producing some evidence of its presence in the shape of physical signs in the chest, abdomen, or glands, although occasionally it is found after death when its presence had not been suspected during life. A syphilitic "taint" may interfere with nutrition, and it is possible that some of the wasting infants who improve so remarkably under the administration of grey powder, as some of them undoubtedly do, may be affected in this way. If in doubt, a blood test should settle the matter.

Diseases of the lungs, such as chronic broncho-pneumonia and "latent" empyema, may be unsuspected causes. Wasting may be due to insufficient intake of food. A common cause is the use of condensed milk in too high a degree of dilution or the giving of small feeds.

Premature infants are very apt to waste. Too large or too strong feeds may cause wasting. Oftener the error consists in giving an ill-balanced mixture which is too rich in one of the food constituents, a relative excess of fat being the commonest fault.

Dyspepsia is so common, either as a cause or as a concomitant of wasting, that there are few marasmic infants who are not also dyspeptic.

The symptoms of dyspepsia may arise suddenly, as in cases of summer diarrhoea, but more frequently the dyspepsia comes on gradually as the result of the continued use of an unsuitable or ill-balanced diet.

Excess of fat in the diet is indicated by constipated, pale, crumbly or soapy stools. Excess of casein is much less likely to be a source of difficulty, and when it occurs leads to vomiting of curd and the passage of tough white particles in the stools. Sugar is the least likely to lead to trouble, but if present in an amount which is beyond the infant's digestive capacity the stools are apt to be loose, watery, and acid, and their passage attended by much flatulence. Usually the digestion of all the food constituents is impaired. The true nature of such cases has so far baffled us.

It is to primary or idiopathic wasting of unknown cause that the term "atrophy" should be specially reserved. There does not seem to be anything wrong with the food and there are no signs of dyspepsia, but the child simply wastes, and after death no cause can be found for the failure of nutrition.

Wasting is apt to become attended by complications. Such babies are very prone to infections by pyogenic organisms which cause boils and abscesses, by the tubercle bacillus, and by the *B. coli*. They are also very apt to contract an infective enteritis or a broncho-pneumonia.

The prognosis in a case of wasting is always doubtful. There is always the possibility of an abrupt collapse which proves fatal, or a sudden and seemingly spontaneously improvement may occur at any moment even in the worst cases. The worst cases are those in which everything seems to be right except the power of gaining weight.

The treatment is not merely dietetic—the general hygiene of the infant is of the first importance. Over-feeding is more perilous than under-feeding, and one must not be too ambitious in the matter of increasing the weight.

Always change the feeding reluctantly, cautiously, and never without good reason, bearing in mind that fat is the ingredient most likely to cause trouble. Before starting a new food it is well to clear out the bowels with a small dose of castor oil, and if acute symptoms of "intoxication" have supervened to suspend all food (except glucose and water) for a few hours, but not for long, remembering that wasted infants stand starvation badly.

Breast milk is the best food in most cases, but is unfortunately often unobtainable. In selecting an artificial food, begin with one which is rather poor in fat and relatively rich in carbohydrate and whose protein is in a digestible form. Sweetened condensed milk (2 drachms to 3 ounces) or a half-cream dried milk (1 drachm to 1 ounce) with the addition of dextri-maltose fulfils these conditions. It may be necessary to feed on a mixture of whey and Mellin's food (dextri-maltose) or whey with the addition of a modified starchy food; if casein is the difficulty the milk should be fully peptonized or citrated; or a dried milk may meet the case.

The more wasted and exhausted the child is, the smaller and more frequent must the feeds be. Drugs are of little use. Grey powder sometimes does good, even in cases in which there is no reason to suspect a syphilitic taint. Alcohol is also helpful, especially if there is much exhaustion.

"You will lose a good many of your marasmic babies in spite of all your care and skill, the fault in many cases is in the child and not in the food, and once the disorder has progressed to a certain length no treatment makes any dramatic difference."

Medical Education.

Extracts from an editorial in the *Journal of the American Medical Association* of October 11th, 1924:—

"In a recent address delivered by Dean Edsall of the Medical School of Harvard University before the Massachusetts Medical Society, he asserts that the standards existing in the United States of America represent not an extreme reached in a period of exaltation, but a tardy arrival at approximately the same standards that had

already been reached by most other highly civilized countries, in nearly all of which financial conditions are much more difficult than here. It is not insufficient numbers but rather unsatisfactory distribution that represents the problem to be solved—a condition that is not peculiar to the United States. Dr. Edsall warns that reducing medical standards would not cure the faulty distribution of physicians, unless those who are briefly and badly trained went especially to the country regions, and there is no evidence that they have done this extensively, or would do it. On the other hand, it is obvious that this would be a highly unintelligent way of meeting the need for physicians in the country regions, and would be clearly recognized as such by intelligent people who employ them; probably it would be resented.

Is medical education justly open to the charge that it has become too scientific? If this refers to the seemingly endless accumulation of more or less isolated facts and to the multiplication of experiences in technique, the fear may be warranted. Edsall would assert that such recent graduates who have 'a conglomerate of information and of technique relating to the sciences which they cannot use very effectively to illuminate their work, the rationale of which in relation to their life effort they do not really comprehend,' are not trained too scientifically but too unscientifically. They have missed the essence of the search for truth and the powers that develop it."

This view of the subject of medical education should be given due attention in India where exactly similar problems have to be faced.

A Daily Medical Newspaper.

THE city of Barcelona has always been noted for its enterprise, and it has now added to its other claims to greatness the inception of a daily medical newspaper, *El Dia Médico*. The first number runs to eight pages of printed matter, and there is a portrait of Dr. Ramon y Cajal, the distinguished histologist, on the front page. The editorial by Dr. Paul Weckesser is on bismuth therapy in syphilis, and full of information. Notes on interesting cases are given, and notices of medical meetings for the day. We wish our enterprising contemporary success, and a long career.

An Investigation into the Causes of Dysentery Prevalent in some districts of Eastern Bengal.

(Abstract of a paper read by Capt. P. Ganguli, B.A., M.B.M. (Bengal), at the Medical Research Section, Indian Science Congress, January 1925.)

Out of 62 cases of severe dysentery admitted for treatment to the Dacca Mitford Hospital, the following causative factors were seen.

E. histolytica (vegetative) was seen in 19 cases (30 per cent.); *E. histolytica* cysts were detected in 7 cases (11 per cent.); Charcot Leyden crystals were found in 8 cases (12 per cent.). The total percentage of *E. histolytica* infection was 53, if the presence of Charcot Leyden crystals be accepted as proof of *E. histolytica* infection.

Shiga bacilli were responsible for 18 cases of dysentery and Flexner group bacilli for 4 cases, giving a total of 22 cases out of 62, the percentage being about 35.

Out of these 56 cases, 7 showed mixed infection of both *E. histolytica* (cysts present) and Shiga bacilli, the reaction of the stools being alkaline (pH 7.5 to 8.5) in all the seven cases. Three dysentery cases showed *Trichomonas* and one of them *Lambia* cysts as well.

In three cases no definite causative organism could be ascertained. In two, however, numerous fungi were seen. *Endomyces tropicalis* and yeast cells were most abundant and there were also *Aspergillus* and *Mucor* in large numbers. Starch and sugar were withheld from their dietary. The patients were put on albumen

water and improved considerably. Both these cases relapsed on sugar being added to their diet. The patients made an uninterrupted recovery after being put on albumen water and gelatine solution for 7 days. The reaction of the stools was highly acid (pH 6.5 and 6.3 respectively).

Incidence of Flagellate and Helminthic Intestinal Affections in Eastern Bengal.

(Abstract of a paper read by Capt. P. Ganguli, B.A., M.B.M. (Bengal), at the Medical Research Section, Indian Science Congress, January 1925.)

THE medical wards of the Mitford Hospital, Dacca, admit patients from Sylhet, Comilla and Mymensingh districts in practically equal proportions. The total number of patients coming from these districts is nearly equal to the number of patients coming from the Dacca district proper. It will thus be seen that the figures obtained from the examination of stools of the indoor patients of the medical wards of the Mitford Hospital is a fair index of the incidence of flagellate and helminthic intestinal affections in Eastern Bengal.

Out of 256 samples of stools examined from January to November, 1924, 91 belonged to kala-azar cases, 60 to dysentery cases, and the rest to miscellaneous diseases. The result of examination of stools was as follows:—

I. Human Intestinal Flagellates.

| | | |
|--|---------------|-----------|
| <i>Trichomonas hominis</i> | .. 43 or 17. | per cent. |
| <i>Chilomastix</i> (Tetramitus) | | |
| <i>mesnili</i> | .. 41 or 4.56 | per cent |
| <i>Giardia</i> (<i>Lambia</i>) <i>intestinalis</i> | .. 11 or 4.3 | per cent |
| <i>Enteromonas</i> (<i>Cercomonas</i>) | | |
| <i>hominis</i> | .. 7 or 2.7 | per cent. |

II. Helminthic Affections.

Nematodes:—

| | | |
|----------------------------------|----------------|-----------|
| <i>Ankylostoma duodenale</i> | .. 68 or 27.47 | per cent. |
| <i>Ascaris lumbricoides</i> | .. 33 or 12.89 | per cent. |
| <i>Trichocephalus dispar</i> | .. 15 or 5.85 | per cent. |
| <i>Oxyuris vermicularis</i> | .. 8 or 3.125 | per cent. |
| <i>Strongyloides stercoralis</i> | .. 4 or 1.6 | per cent. |

Trematodes and cestodes:—

None were observed in the stools of the indoor patients.

It will be seen from these figures that the incidence of *Trichomonas* (17 per cent.) is rather high in comparison with Major Knowles' Calcutta figure of 1922. He found it present in 18 out of 233 stools, giving a percentage of 7.7. Wenyon's percentage was 3 in 550 persons examined.

The incidence of *Chilomastix* is very low in Eastern Bengal. Knowles' Calcutta figure for 1922 gave it as present in 22 out of stools of 185 patients, showing a percentage of 8.4, in comparison with 1.56 in Eastern Bengal.

Giardia infestation in Eastern Bengal (4.3 per cent.) approaches closely to Wenyon's figures, viz., 5 per cent. The Calcutta figure gave it as present in 8.8 per cent.

Observations on Malaria Control, with special reference to the Assam Tea Gardens, and some remarks on Mian Mir, Lahore Cantonment.

By SIR MALCOLM WATSON, M.D., C.M., D.P.H., LL.D.
(From the Transactions of the Royal Society of Tropical Medicine and Hygiene,
23rd October, 1924.)

"EARLY this year I visited a large group of tea estates in Upper Assam for the purpose of advising on the control of malaria, which was prevalent in the gardens. During my stay of three months I had also an opportunity, through the courtesy of the medical officers, of seeing a number of other gardens and enquiring into their health conditions. From what I saw myself, and also from what Professor C. Strickland told me, malaria

is spread widely throughout Assam. As a result of malaria and other diseases and the generally insanitary conditions which formerly prevailed, the death rate of the labour forces was high. But, thanks to the admirable work done on the various gardens, the very high death rates were things of the past. I was much struck by the excellence of the work done on the gardens, and I think the medical officers of the tea gardens in Assam have reason to be proud of the record of their work. To-night I propose to discuss briefly, illustrating my remarks by lantern slides, the general nature of the work which has lowered the death rates of the gardens, and then to discuss the light this throws on the present feeling towards malaria control in India generally, and of malaria in Mian Mir, now called Lahore Cantonment, in particular.

Before considering the conditions seen in Assam, I should like to show you a few slides illustrating the methods of malaria control in the Federated Malay States.

1. First come the tide gates and deep drainage of the mangrove swamps, illustrated by Port Swettenham and Carey Island. On the island, over 20 sq. miles have been cleared of jungle, and drained, with practically the complete abolition of malaria. The spleen-rate of over 900 children is 0.9 per cent. The carriers of malaria were *Anopheles umbrosus* and *A. ludlowi*.

2. Then comes the open drainage system of the coastal plains. Malaria was carried by *A. umbrosus*. It and the malaria disappeared with the drainage and cultivation of the land.

3. In the coastal hills there was malaria from the presence of *A. umbrosus* when the ravines were covered by jungle, and from *A. maculatus* when the ravines were cleared. We escaped from the dilemma by putting the springs and streams in subsoil pipes, and using refuse oil. In Singapore the Health Officers have saved some 35,000 lives since they began the work in 1912. In Kuala Lumpur it was the best residences in the town, those belonging to the highest government officials, which were most severely attacked. Quinine and general sanitation failed. Salvation came by a direct attack on the mosquito.

4. To Dr. Strickland we owe the observation that the inland hills are free from malaria when they are under jungle, because *A. umbrosus* does not breed in them. They become malarial only when cleared, for then *A. maculatus* appears.

5. Our inland plains are not large in extent; they are, however, more or less malarial, depending on the extent to which *A. maculatus* and *A. minimus* (syn. *albirostris*, *aconitus*, *listoni*) find the local conditions favourable.

6. On the coastal plains, rice-fields are generally healthy, while in the valleys they are generally unhealthy. On the plains the *Anopheles* are *A. rossi*, *sinensis*, *barbirostris*, *kochi*; while in the valleys, *A. minimus* and *maculatus* are added. In the last twenty-four years a good deal of work has been done in Malaya, and the results may be summarised pretty fairly as above.

Now Malaya is a land covered by an evergreen jungle, in a moist climate, with a high rainfall, and temperature which ranges roughly between 70°F. and 90°F. every day of the year. Some months are much wetter than others; but long periods of dry weather are unknown. If we have three weeks of dry weather we are all grumbling. From the combination of temperature and rainfall, you will readily understand that Malaya has a rich anopheline fauna; a fauna which reaches up into Assam, for the countries have a direct land connection through Burma, and, as Colonel Christophers has pointed out, the conditions in Assam and Eastern Bengal approximate, perhaps, more closely to those of Malaya in the past than they do to-day in rainfall and, therefore, in jungle, etc.

The Assam Valley, in the upper or eastern part of which I spent my time, is bounded on the north by the Himalayas, and on the south by a mass of hills, which cuts off India from Burma. At the eastern end of the

valley the hills are known as the Naga Hills. I understand that great faulting has occurred on the south side of the valley, but, generally speaking, the valley represents a deep trough between the two masses of hills to north and south. The trough has become filled by detritus from the hills. There is evidence that at one time it formed an estuary of the sea. However that may be, the present land surface of the valley is a fine alluvial soil, the great asset of the tea gardens.

The Brahmapootra ploughs its way down the valley, rather on the northern side, while many other rivers are cutting their way through it, in a manner which I shall shortly explain.

In the slides you will see a broad flood plain, bounded by high banks and traversed by a winding, living river. You will see two dead loops of the river, where it has changed its course. In other photos you will see this loop gradually becoming silted up, until it reaches the general level of the flood plain.

Originally the flood plains were under jungle; with the opening up of the estates, the coolies have cleared away the jungle to plant rice. The river plains were too wet for planting in some places, e.g., along the edge of the high bank or "khud," especially where the river was at the opposite side of the plain; and in the dead rivers before they had been filled up.

In these places I found *A. maculatus* and *A. minimus* in abundance, and I was not surprised to find much malaria.

On land such as I describe, I examined various groups of children, totalling 9,146. Their spleen-rate was 69 per cent. Of these, 2,416 of two years and under, 61 per cent. had enlarged spleens, so we were evidently dealing with intense malaria.

Cattle, which were in great abundance, seemed to give the coolies little protection.

The percentage of the various species of *Anopheles* caught differed in cowsheds and houses. The following are the figures for *Anopheles* caught between 25th January, 1924, and 23rd February, 1924:—

| | <i>A. fuliginosus</i> . | <i>A. minimus</i> . | <i>A. sinensis</i> . | <i>A. maculatus</i> . | <i>A. gigas</i> . | <i>A. rossi</i> var. indef. | <i>A. barbirostris</i> . | |
|----------|-------------------------|---------------------|----------------------|-----------------------|-------------------|--------------------------------|--------------------------|------|
| Cowsheds | 2054 | 42 | 28 | 10 | 0 | 0 | 1 | 2135 |
| Houses.. | 60 | 95 | 45 | 7 | 2 | 1 | 0 | 210 |

The finding of *A. gigas* at a level of under 400 feet above sea-level is new. Larvæ were also found. They could not have been washed down from the hills.

The estates which I was advising are universally regarded as amongst the very finest in Assam. They are wealthy, well managed, and have spared no pains to make their labour forces healthy, happy and contented.

The slides show how well the coolies are housed. The old groups of coolie lines are being steadily broken up, and the people given individual houses, each with its garden. Some of the gardens have good piped water supplies; others brick wells. Some have latrines of a good type; others buckets. A few have none.

The pregnant women are given full pay or food for some months before and after their confinement, and are not allowed to work. The children are given one full meal free of charge each day. Any adult who is not fit for a full day's work, or who has recently been discharged from hospital, is put into a "Challan." He does only such work as the medical officer prescribes, and is given pay and food.

Practically everything anybody could think of to strengthen the coolies in their fight against disease is being done, and the result has been a notable diminution in the death rate. But the fact remains that all these

measures fail to prevent the coolies becoming infected with the malaria parasite. It helps them to acquire immunity: and I gathered the impression that, to a certain degree, immunity was inherited by the children. Nevertheless, 69 per cent. of the children on the gardens had enlarged spleens.

In Assam, as in the Malay States, no amount of quinine and general sanitation or education of the people is of any avail to stamp out the disease. Nothing but a direct attack on the mosquito can give the desired result; and that I recommended.

There were two ways of controlling the insects. One was to remove all coolie lines to a central spot, and to abolish all breeding-places within half a mile. This would have been very expensive, for it would have cost a large sum to remove and rebuild the coolie houses, and an even larger sum in loss of profit from cutting out 100 acres of tea in each 1,000 acres.

The other method was to leave the coolies where they are, on the edge of their rice-fields, and to strike at the two dangerous *Anopheles*, namely, *A. maculatus* and *A. minimus*. Before deciding on this, I examined a number of estates to ascertain if healthy rice-fields existed in Assam, as they did in the Malay Peninsula, Java, British Guiana, and other parts of India, and generally what the nature of malarial land was in Assam.

I show you some photos which illustrate what I found.

The physical features associated with malaria were:—

1. River valleys, whether large or small, but not when as large as the Brahmapootra at Dibrugarh.
2. Swamps and "bils" in dead river beds, or in the flood plains of living rivers.
3. Natural hollows or water channels, which may be dry in the dry season.
4. Narrow rice-fields under certain conditions, especially in land above the 400 feet level.
5. Wet waste land, "Kurkani land" and some thatch land.

The physical features not associated with malaria were:—

1. Broad, flat rice-fields.
2. Old broad, dead river channels, dry in the dry season.
3. Dry thatch land, if not "Kurkani."
4. Bamboo clumps.
5. Some brickfields.

Generally speaking, the lower and flatter the land the lower the spleen-rate. As in the Federated Malay States, the higher the land, the better the opportunity for *A. maculatus* breeding, the higher the spleen-rate.

In Assam it was among the best and the best managed estates that malaria was most prevalent; not because of neglect of sanitation or any other general measure, but because of the nature of the land and the presence of certain species of *Anopheles*.

In Kuala Lumpur, in the Federated Malay States, malaria was worse among the best housed and best educated people.

In Havana, as General Gorgas tells us, small-pox had been entirely eradicated. But the great result at which we aimed seemed to be as far away as ever. "Our sanitary measures, if they had any effect on yellow fever, seemed to increase it. The cleanest and best built part of the city seemed to suffer most from the disease, and the best fed and best cared for part of the population was that which had the largest rate of deaths from yellow fever. It was the well-to-do class of Americans and the highest officials on the staff of the Governor-General who suffered out of all proportion to the rest of the population. It looked very much as if the cleaner and better hygienically we got the city, the worse we were making yellow fever."

This does not mean that education and general sanitation are valueless; but I can find no evidence that they can control either malaria or yellow fever. Accordingly, a system of drainage to strike at *A. maculatus* and *A. minimus* is now under construction, some photos of which I show you. Oil will be applied where neces-

sary. Cinchona is being given to the children and fever cases.

With all these measures together I have little doubt that we will soon have the disease under control.

MIAN MIR.

From Assam I went to the Punjab and visited Mian Mir, or, as it is now called, Lahore Cantonment. I speak of it not with the idea of reviving an old controversy in any bitter spirit, but for the sake of discussing whether or not the methods adopted between 1902 and 1908 for the eradication of malaria were the ones we should use to-day, were the work to be done; and if the conclusions drawn by the Commission of 1910 are the last words to be said on the subject. For if they are, then I think the prospects of freeing the Punjab, and many other parts of India, from malaria are slight indeed. It is to me like passing a death sentence on millions of people. I believe there is a brighter outlook.

In Mian Mir, in the past, I think there is little doubt that serious mistakes were made. But then it is true that he who never made a mistake never did much. It must not be forgotten too that this was the first attempt to control malaria in India, and that the presence of the irrigation system complicated the problem and confused the issue. Let me candidly admit that for some years we cleaned up the ravines in our hill land, making malaria the worse. We had to adopt an entirely different method. Let me remind you too that in 1901 when the Federated Malay States Government gave me the money to clean up Klang, Dr. Braddon applied for money to clean up Seremban—a town on the main range. Presumably he would have felled jungle and "trained" streams, and would have caused a big outburst of malaria in, at that time, a healthy town. Had that occurred I can imagine the progress of malaria prevention in the Federated Malay States would have been seriously retarded, as it has been in India by the experiment done in Mian Mir.

Now I do not propose to discuss the statistics of Mian Mir, or what was done by the various people in charge between 1902 and 1909. The broad fact remains that they did not achieve the results expected; and even to-day Mian Mir has an evil reputation as a malarial cantonment.

The Commission appointed in 1910 concluded, from their inspection of Mian Mir, that the problem of malaria control in India was one of great complexity, and that large and costly schemes, such as had been carried out in other countries, were beyond the resources available in India.

They thought that the work of the immediate future lay in patient and searching investigation and in careful and continued experiment. With that I entirely agree, but the war stopped all chance of investigation and experiment. The Commission also concluded that the active co-operation of the people and the general amelioration of the insanitary conditions of life which are potent factors in augmenting the disease, are essential if malaria control is to be successful. "Such amelioration must come in the main from the people themselves, and their education thus lies at the root of the problem." With this I disagree.

I have told you what I have found in Malaya and Assam; I am, therefore, in total disagreement with the final conclusion just quoted. No amount of general sanitation, nor universities crammed with receptive students dotted all over the Punjab, will clear malaria from India unless the mosquitoes which carry the disease are destroyed, or some medicine, vastly more effective than quinine, is discovered.

Looking at Mian Mir with the experience of twenty-four years' work on malaria to guide me, I came to the conclusion that:—

(a) The cantonment is not and never has been properly drained. This is practically admitted in the 1910 report.

(b) The Royal Artillery bazaar, where the experiments of 1902 and 1903 were carried out, is furthest

from the drainage outlet, and the 1910 report says this area could not be effectively drained (p. 16, par. 42).

(c) Assuming that there is no available outlet for the drainage, the question of pumping out the water with a centrifugal pump does not seem to have been considered, yet, as I have shown you, it is effective and economical on an estate in the Federated Malay States, in spite of a rainfall of four or five times that of Mian Mir.

It seems to me that the whole question of the control of malaria in this cantonment should be reconsidered, in the light of what we know of malaria control to-day, and I believe that, were an experiment conducted on such lines carried to a conclusion, the present rather pessimistic view of the future of malaria control in India would disappear as the dim old miasma hypothesis faded before the light and warmth of the illuminating genius of Ronald Ross.

In conclusion, I should like to pay a tribute to the wonderful contributions made to medical science and public health by the Indian Medical Service. This Service has earned a deserved reputation throughout the world, and I am sure it will realise the importance of dealing with the urgent problem of malaria control in Mian Mir and other parts of India, and in resuming the work commenced and abandoned so many years ago."

DISCUSSION.

Sir Ronald Ross: I have not got much to say. I am very glad you began, Sir, by congratulating Sir Malcolm Watson on the honour which has been conferred on him by the King. It is highly deserved, after nearly a quarter of a century hammering away at this one piece of work. Also we must congratulate him on the honour he has received from the University of Glasgow. He is going back to-morrow, full-fed with honours, and with some dinners, etc.

This work of his has really been very great. I do not think we in this country quite understand it. We know the work done in America by Gorgas, and that was splendid work—I am not likely to depreciate that—but we must remember that, both in Havana and in Panama, Gorgas had behind him the full wealth of the United States Government, and that was a great advantage, too, in the Panama Isthmus Commission. The reduction of malaria in those places was a state affair. The matter was quite different with Sir Malcolm Watson. He started his work—this antimalaria work—at about the same time as Gorgas, a quarter of a century ago, and he worked at first almost by himself. There are some names associated with him: Hamilton Wright and Travers helped him, and there was Professor Strickland, and now, recently, Dr. Scharff, who has been working in Singapore. But Sir Malcolm had to raise the money and do the work at the same time, and everybody knows that is not an easy job. He had to persuade the planters to use his methods, and he had to talk, and very persuasively, to hundreds of people. It is one thing to kill the mosquitoes, but it is a much more difficult thing to get money out of the pockets of the planters, and that is what he had to do. He has continued that work for a quarter of century, with results that he has not given sufficiently in this lecture. He could have gone on for another two hours telling us more details of the work. I think what he has done has added immensely to our knowledge generally. It shows how different species of mosquito must be dealt with in different ways. But it all comes to the same thing in the end: it brings us to the rule—which I was, perhaps, one of the first to lay down, about a quarter of a century ago—that there should be no stagnant water round settlements. He has shown that you must deal with each species of carrying mosquito on its own merits or basis.

I agree with his last words about Mian Mir. I will not say anything about the old fights we had about Mian Mir, but I strongly advised the Indian Government to take up the subject, and not leave to own to the

defeat of mankind by the mosquito. The mosquito kills in this world, I think, something like two million people a year, and that is a low estimate; it is a greater mortality than was caused by the war. The mosquito is a terrible enemy of mankind, and we must set ourselves to oust it as much as we can from the centres of population. I refuse to admit I have ever said you can get rid of mosquitoes all over the world, but perhaps if we had spent as much money in reducing mosquitoes as we have in killing each other in the recent war we might have achieved it. But I think we should smarten up this war, and that all planters should try to get rid of malaria from their own plantations.

I will deal with only one more point. Removing mosquitoes costs money, but the planters, the Government, and everybody else forget that malaria costs much more money. Look at all the sickness which is caused by it; look at the invaliding, and not only the money it costs, but the misery it produces. Then put on the other side the cost of reducing it.

Sir Malcolm Watson has done a triumphant piece of work for the British Empire, equalling that done by Gorgas for the United States, and I cordially congratulate him on his lecture to-night.

A Cancer Enquiry Card.

As our readers will remember, the question of the rarity or otherwise of cancer in Indian patients was recently raised in our columns by Lieutenant-Colonel H. Halliday, I.M.S., and at the time we suggested that if information on the subject were to be collected, it should be done so on a systematic basis, and some standard form of enquiry card used. We have now received from Colonel Halliday the following suggested enquiry card in this connection, filled in with the history of a hypothetical case:—

Cancer Enquiry Card:—

| | | |
|--|----|--|
| Name | .. | Radha Kishen. |
| Age | .. | 69. |
| Sex | .. | M. |
| Caste or Race | .. | Hindu. |
| Occupation | .. | Clerk. |
| Literate | .. | Yes. |
| Residence (Village or Town). State years of residence | .. | Jullundur city (since leaving school). |
| History of Chronic Irritation. (Pan, Kangri, soot, tar, etc.) | .. | Pan chewer, 50 years. |
| Constipation. (Average number of stools daily.) | .. | Severe since childhood. Bowels open every 3 days. |
| Gastro-Intestinal History. (Gastric ulcer, appendicitis, gall-stones, etc.) | .. | Gangrenous appendix removed in 1916. |
| Clinical diagnosis of the growth | .. | Epithelioma. |
| Site | .. | Tongue. |
| Operation | .. | Hemisection. |
| Pathological Report. (State name of pathologist and laboratory in which examined.) | .. | Epithelioma. Prof. of Pathology, K. E. Hospital, Lahore. |
| Lymphatic Involvement | .. | Yes. Sublingual. |
| Subsequent History | .. | Died of hæmorrhage from cervical recurrence. |

The Silhouette Radiogram.

We recently had the pleasure of reviewing the very fine atlas of silhouette radiograms of the bones and joints by Mr. A. P. Bertwistle, M.B., Ch.B. (Leeds), Resident Surgical Officer, General Infirmary, Leeds. Mr. Bertwistle sends us the following short note on the process, from the *Canadian Medical Association Journal*, August, 1924, and the very remarkable series of silhouette

radiograms from the *Lancet*, 1923, II, p. 783, which we reproduce with due acknowledgments to both journals. As our readers will see, the method is a vast improvement on the ordinary radiogram.

"It is a striking fact that whereas a radiographic negative clearly indicates the outline of the flesh, a print from such a negative fails in this particular. The result of this loss is that the print loses much of its value; it is something apart from clinical diagnosis, and gives no evidence of the points on which the clinical diagnosis was made.

Some text-books seek to indicate soft parts by over-exposing the prints, but they do so at the expense of

the skin, which is always apparent, is scratched with a mounted needle. When the negative is printed the margin, thus outlined, shows as a black line. The background is now filled in with Indian ink, and the silhouette radiograph is complete.

This method of printing enables one to form an idea of what the radiograph findings will be, when certain deformities are next met with. A silhouette radiograph of a dislocated shoulder reveals the loss of the deltoid fulness—the basis of Hamilton's ruler test—and increased axillary girth—(Calloway's test). When such alterations in the shoulder are next encountered it will be easy to visualize an empty glenoid fossa, and

I.

II.

III.



FIG. I.—Caries of thumb. Note (1) Bone: disorganisation of distal part of terminal phalanx, with abscess cavity in which is sequestrum; and (2) Skin: bulbous end, the result of periosteal whitlow.

FIG. II.—Rickets showing characteristic contour and accompanying bony lesion. (Stage 1 of method.)

FIG. III.—Callus of ulna.

IV.

V.

VI.

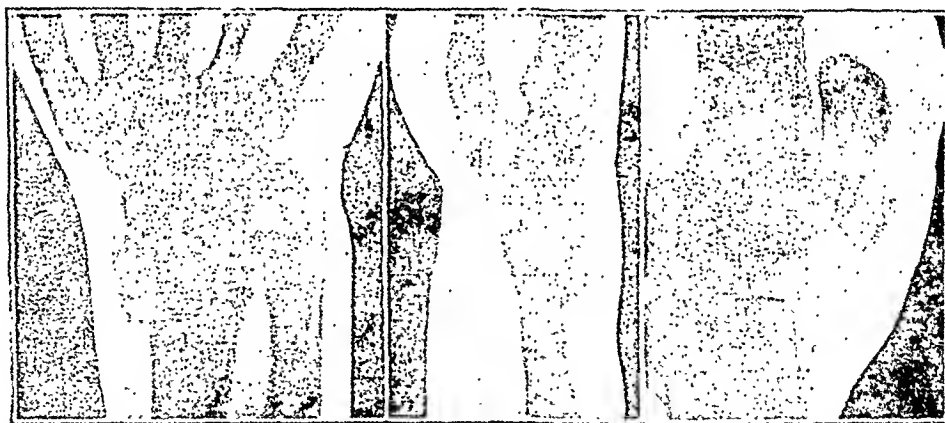


FIG. IV.—Colles' fracture. Note (1) Bone: impaction of radius so that styloids of radius and ulna are on the same level; and (2) Skin: radial deviation.

FIG. V.—Normal wrist-joint.

FIG. VI.—Fracture of patella. Note (1) Bone: transverse fracture due to muscular effort, and upward tilting of lower fragment; (2) and Skin: swelling of joint and depression over site of fracture.

the bony definition. A radiograph is intended to show bones with the greatest possible distinctness.

The silhouette* radiograph was evolved with the object of at once correlating the clinical findings with those of the roentgen rays. The ordinary radiograph is largely a shadow photograph of bone; the silhouette radiograph is one of flesh and bone. The method is simple in the extreme. A negative is held up to the light, or placed in an illuminator, and the margin of

the head of the humerus lying beneath the coracoid process. The bulbous finger tip, and spindle fingers, are suggestive of a periosteal whitlow, and tuberculous dactylitis respectively. In an injury to the knee, loss of extension, and a transverse depression over the site of the patella make a fracture of that bone highly probable. The loss of the gentle sweep of the shoulder points to a dislocated, or fractured clavicle. On seeing

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a hand radially deviated, and displaced backwards in the "dinner fork" position, it is easy to visualize that the underlying cause is an impacted fracture of the radius, with backward displacement of its lower end. The "wave deformity" of the forearm, with dorsal trough and ventral crest can only mean a "greenstick" fracture of radius and ulna.

Thus the underlying cause of any swelling is readily ascertained. Where the swelling is due to bone disease it is intimately associated with that disease. Where, on the other hand, the bones are normal the cause must be sought elsewhere.

The geography of sinuses injected with bismuth, or into which a probe has been passed can be readily studied. Foreign bodies instead of appearing "in space" show their proper relations as regards depth and position.

By means of the silhouette radiograph it is possible to confirm the impressions formed by palpation. In a dislocated elbow it is easy to see how the hard mass anteriorly, and the loss of resistance posteriorly, are caused.

Muscular wasting is an important sign of bone tuberculosis. In the selecting of many plates considerable help was given by this feature. Malignant, or rachitic disease is not so accompanied, nor is osteomyelitis in which condition irregularities due to sinuses are often seen. The adequacy, or otherwise of the coverings of a stump is apparent. All this is lost in the simple radiograph.

An important asset of the silhouette radiograph is the manner in which it shows the position of the limb at the time of the screening. In consequence of the risk of loss and breakage it is not always advisable to send negatives by post. I would suggest that if the skin outline were scratched on the negative before a print was made, the practitioner would at once recognize its increased usefulness.

The addition of the silhouette should aid diagnosis in that it imparts a much needed reality to the radiograph."

REFERENCE.

* X-ray prints. A suggestion. *Brit. Jour. Surg.*, January, 1923.

Blastomycosis in the Duars.

(Abstract of a paper read by Capt. P. Ganguli, B.A.,
B.R.M. (Bengal), at the Medical Research Section,
Indian Science Congress, January, 1925.)

THIS is a very common affection in the tea-gardens of the Duars. It occurs chiefly among the coolies working in the gardens situated between Bhutan and Cooch Behar. It is prevalent during the rainy season, causing tremendous loss to the gardens in the collecting season. Generally 10 to 40 per cent. of the coolies become affected, and the cure takes a very long time—from 6 months to a year or more. Like Naga sore, trauma is one of the principal factors in the causation of this disease. In some cases it appears as a small ulcer from the beginning, but in the majority of cases it begins as an elevated warty growth which ultimately develops into an ulcer. In a few cases, the warty growths remain dormant for some time and undergo spontaneous absorption for the time being, only to recur as numerous warts round the cicatrices, which ultimately ulcerate. After some time they take on a gummatous appearance and the surrounding parts become oedematous.

Scrapings from these warts showed yeast cells and culture in saccharose agar was successful.

Reviews.

THE MEDICAL YEAR BOOK AND CLASSIFIED DIRECTORY, 1925. London: William Heinemann (Medical Books), Ltd. Pp. 598. Price 12s. 6d. net.

THIS little handbook contains a wonderful digest of information. It is edited by Mr. C. R. Hewitt, late Librarian of the Royal Society of Medicine, and Assistant Librarian, Royal College of Surgeons. Practically speaking, it is a medical "Whitaker's Almanac," replete with useful and miscellaneous information with regard to the medical profession in England, and a book of reference essential in every large medical library.

Included within its covers are a diary of meetings of medical societies for 1925; a review of the present position of the profession of medicine, medical education and registration; an account of the London Hospitals and Schools, Metropolitan Hospitals, and a list of London consultants and specialists; an account of the Provincial Universities, Hospitals, specialists and consultants; parliamentary and medico-legal news; information regarding the Royal Army Medical, and Naval Medical and other services; of medical and benevolent societies; of nursing associations, and of medical periodicals, works and pamphlets; together with an obituary for 1924. There can be few questions with reference to the medical profession in the British Isles which cannot be answered on reference to this very complete volume. It has a very complete index, and the general practitioner who wishes to answer any of many miscellaneous questions, from the selection of a consultant in tropical diseases at Home to whom to send a patient, to that of a medical school to which to send his son for professional education, will find within it a mine of useful information and instruction.

A TEXT-BOOK OF PATHOLOGY.—By W. G. MacCallum, Professor of Pathology and Bacteriology, the John Hopkins University. 3rd, 1924, edition. 8vo; 1162 pp.; 575 Illustrations, including many coloured plates. Philadelphia & London: W. B. Saunders Co. Price 45s. net.

MACCALLUM'S "Pathology" is perhaps the best of all the well-known standard text-books on this subject, both for the student and for the general practitioner. Its author is one who has a world-wide reputation as a morbid histologist, and there is hardly any other general text-book on pathology which is so detailed, so splendidly illustrated, and so valuable as his with regard to morbid histology. "Pathology and clinical medicine" he writes, "are after all the same thing viewed from slightly different angles." But from what different angles; since the first strives to explain and to lay the foundations for the second! Ultimately most diseases depend upon injury to or disturbance of function of the different tissues, and it is especially from this point of view that the book has been written. Haematology, bacteriology, and the much vexed question of the fundamentals of immunity, the author does well to refer to but briefly; his intention is to describe the macroscopic and microscopical changes associated with different diseases, and in this aim he has succeeded admirably. As his main thesis is the changes consequent upon injury to or disease of the tissues, the pathology of tumours occupies a special and separate section.

In this third edition much has been re-written or revised. The sections on rickets, diabetes and insulin, epidemic encephalitis and typhus, for instance. The illustrations are very good indeed, whilst the numerous colour plates lend an added value to the volume and teach more than would pages of text. Tropical diseases do not receive special attention in the volume, but what information there is, is accurate. Recent work

on the endocrine glands receives full recognition, and is well illustrated.

As a handbook of general pathology for the student and general practitioner, MacCallum's is an exceptionally detailed, well written and well published work. It has for many years been a favourite book for consultation in the larger pathological laboratories, and for the student. There are few books which are its equal in this special field.

PATHOLOGICAL TECHNIQUE; A PRACTICAL MANUAL FOR WORKERS IN PATHOLOGICAL HISTOLOGY AND BACTERIOLOGY.—By Frank Burr Mallory, A.M., M.D., Pathologist, Boston City Hospital; and James H. Wright, A.M., M.D., S.D., Pathologist, Massachusetts General Hospital. 8th edition. Philadelphia & London: W. B. Saunders Co., 1924. Pp. 666. Illustrations 180. Price 32s. 6d. net.

"MALLORY AND WRIGHT" is a staunch and well-trying friend of the laboratory worker and clinician, and in its own particular sphere is quite unique. The authors' aim is not the production of some standard text-book on morbid histology, or a treatise on bacteriology, but a work of practical value to the student, the laboratory worker, and the general practitioner. Given the preliminary autopsy on a patient who has died,—full and explicit details for which are given in a special chapter—and a full case-history and details of the post-mortem findings, the clinical pathologist is still far from having finished his task. He has next to study the morbid histology of the organs removed, to carry out bacteriological and protozoological enquiries. And, in assisting him in such a task, we know of no other standard book which so admirably meets the requirements of the laboratory worker. "The solution of the problem often requires the highest skill in post-mortem, bacteriological and histological technique, but in its solution lies the fascination of pathological work." Thus it will be seen that the scope of this well-known work is both comprehensive and yet detailed; gross morbid anatomy may begin the solution of the problem, but before it is fully solved bacteriological, histological and even biochemical methods may be requisite. And in its presentation of such methods "Mallory and Wright" is unique. The bacteriological micro-photographs alone constitute a very fine feature of the work, as they have always done.

The various sections of the book deal with histological methods,—a section which is full, authoritative, detailed and very valuable; bacteriology and mycology, animal parasites, blood examinations, serological technique, and detailed instructions for post-mortem examinations. The present, 8th edition, has been largely re-written; Dr. R. N. Nye having re-written the five sections devoted to bacteriology and serum diagnoses; Dr. T. E. Buckman that on technique of examination and interpretation of results; Dr. S. T. Orton that on the central nervous system; Dr. J. B. Ayer and Miss J. R. Cockrill that on examination of the cerebro-spinal fluid; and Dr. D. Munro that on the method of opening the skull in the new-born. Other sections on pigments, fats and lipoids, and museum specimen preparation have been largely re-written. In brief the book is even better value than ever before; one which the laboratory worker will find unusually comprehensive and authoritative in scope; whilst at the same time being a valuable *vade mecum* for the student and general practitioner.

HANDBOOK OF CONDENSED DIFFERENTIAL DIAGNOSTICS AND URINE EXAMINATIONS.—By Gurdit Singh, L.M.F. (Bengal). Lahore: Khosla Printing Works, 1924. Pp. 141. Price Rs. 4.

THIS little handbook will be one welcomed by medical students in India. Whilst it lays no claim to originality, it is yet useful in presenting in tabular form the differential diagnoses between diseases which may simulate one another; in impressing on the student the essential points in the diagnosis of different common diseases,

and in summarising information from larger treatises. Various tabular sections deal with the differential diagnosis of the infectious eruptive diseases; of the comatose states; of acute eye affections; of acute inflammations of the throat, of the breast and the chest. Diseases of the lungs are next fully dealt with, again in tabular form; followed by sections on the differential diagnosis of conditions associated with acute epigastric pain and with hepatic symptoms. The diarrhoeas, renal and testicular affections, chancres and the different types of dysmenorrhoea are then dealt with, followed by tables dealing with the diseases causing pain in the lower abdomen and pelvis and in the joints. A very full section on urine analysis, and the interpretation of its results, is finally followed by a full index. The general get up and binding of the volume are good.

Such a book may be of special value as a cram book for students preparing for examination, but it is also something more; a useful and original digest of the larger and more detailed volumes, useful for reference for the general practitioner, and in its tabular form especially convenient for referring to. On the whole a book that we can recommend both to the student and to the general medical practitioner in this country. The author might, perhaps, have taken more account of those diseases most common in the tropics, but he has done his work well, and the book is a very useful one.

LANDMARKS AND SURFACE MARKINGS OF THE HUMAN BODY.—By L. Bathe Rawling, M.B., B.C. (Cantab.), F.R.C.S., Surgeon to St. Bartholomew's Hospital. Sixth Edition. Thirty-six illustrations. Pp. viii plus 98. H. K. Lewis & Co., Ltd.: London, 1924. Price 7s. 6d. net.

WE welcome the sixth edition of this excellent book on surface anatomy. All the important surface markings are particularly clearly described, and at the end of the book three appendices give the length of various passages, tubes, etc., weights of the more important organs, and the ossification, and epiphyses of the bones of the upper and lower extremities. There are five more illustrations in this edition than in its predecessor and generally speaking they are far clearer and more striking.

The only criticism we offer is that the new terminology, which is taught in India, finds no place in this book. Owing to its general excellence, small and handy size, and large, good type, we strongly recommend it for the use of students and general practitioners.

A MANUAL OF PRACTICAL CHEMISTRY FOR PUBLIC HEALTH STUDENTS.—By Alan W. Stewart, D.Sc., A.I.C. 2nd edition. London: John Bale, Sons & Danielsson, Ltd., 1924. Pp. 83. Price 5s.

THIS is the second edition of a small book which many students have found useful in preparing for the chemistry of Part I of the D. P. H. examination. It is intended as a bench book for easy reference during practical work and "not to replace the text books on public health chemistry." This disarms some obvious criticisms to which it might otherwise be open. Experience has shown that the book has proved useful and no doubt the new edition will find a ready sale. The practical methods given are described shortly and clearly, and as a rule accurately. There are one or two statements one would like to see put more correctly for the elementary student. Nowadays very few analysts adopt Clark's scale of hardness as the only one.

On p. 50 the "simple formula" for estimating the percentage deficient in fat is misleading. It takes no account of the reduction in the fat as the result of watering. The matter is not so "simple."

The difficulties in the analysis of sour milk are not indicated.

The Leffmann Beam modification of the Reichert-Wollny process is that now usually carried out, but is not described.

On p. 56 butyric, caproic, caprylic and capric acids are stated to be "volatile and soluble." This statement is open to objection, in fact is probably not true. The Polenske process is not mentioned. As we have stated, the book is a useful bench companion but is hardly complete enough and has a few mis-statements.

A HANDBOOK OF MIDWIFERY FOR MIDWIVES, MATERNITY NURSES AND OBSTETRIC DRESSERS, 6th Edition.—By Comyns Berkeley, M.A., M.C., M.D. (Cantab.), F.R.C.P. (Lond.), M.R.C.S. (Eng.). Cassell & Co., Ltd.: London, 1924. Pp. 578. Price 8s. net. Illustrated.

The sixth edition of "A Handbook of Midwifery for Midwives, Maternity Nurses and Obstetric Nurses" by Dr. Comyns Berkeley is well up to the standard of its predecessors. It is extremely difficult to arrange a book of this nature so that the readers for whom it is meant do not have to wade through a maze of unnecessary material, and at the same time to present them with the essentials. This work appears to us to strike the happy medium. The paragraphs explaining what the doctor will do when the case goes beyond the ordinary powers of the midwife are particularly useful in this country, where the nurse may be many hours' journey away from the nearest doctor and where she may be called on to deal single handed with obstetrical emergencies.

The chapter on ante-natal work is excellent, as is also that on the care of infants. If we have any criticism to offer it would be that the table showing the height of the uterus at various periods of pregnancy is likely to give a wrong impression. We have never found the fundus uteri two inches above the symphysis at 4 weeks; and also the method of determining whether the arms are extended or not in a breech presentation—i.e., by estimating the distance of the angle of the scapula from the middle line—seems to us to be well calculated to lead to errors in diagnosis. However, those are small points.

The script is excellent and the illustrations well carried out. The fact that since the fifth edition appeared in 1920 there have been three reprints and a sixth edition recently testifies to the great practical value and popularity of the work.

DYSPEPSIA: ITS VARIETIES AND TREATMENT.

By W. Soltau Fenwick, M.D., B.S. (Lond.). 2nd Edition. London and Philadelphia, W. B. Saunders Co., Ltd., 1924. Pp. 515. Price 24s. net.

The original plan of this book was formed thirty years ago, but the present volume is far different from the one originally contemplated by the author.

There is no branch of medicine which is more difficult than dyspepsia, and it is likely that most practitioners will welcome the help which Dr. Fenwick offers to them in this volume. The author has had a vast experience in dealing with dyspepsia, and his methods of treatment have the great merits of success and popularity.

Dyspepsia in India is even more difficult than dyspepsia in European countries and up till now no serious attempt has been made to write a connected account of the subject. Dr. Soltau Fenwick has written three other books on diseases of the stomach, it is perhaps a pity that he did not attempt to combine all his work on gastric disorders in a single volume.

The advanced practitioner and the teacher of medicine will certainly find help and inspiration from this book.

ESSAYS AND ADDRESSES ON DIGESTIVE AND NERVOUS DISEASES AND ON ADDISON'S ANÆMIA AND ASTHMA.—By Arthur F. Hurst, M.A., M.D. (Oxon.), F.R.C.P. London: William Heinemann (Medical Books), Ltd., 1924. Demy 8vo., pp. vii plus 306, 15 plates, 50 figures. Price 21s. net.

This is a fine collection of essays and addresses by Dr. A. F. Hurst; the contents have in many instances been published in various British journals. It will be very useful to students and practitioners, not only

because it brings together the subjects in an orderly whole, but also because the articles have been revised and expanded by the author in the light of recent researches. The titles and presentations of the subjects are novel, the chapters on "sins and sorrows of the colon," ulcerative colitis, the nervous disorders of the stomach and intestines, appendicular dyspepsia, gall-bladder diseases, hysterical elements in organic diseases and asthma cover a wide field, and are written in a clear and illuminating style. In Addison's anæmia the author found achylia gastrica a constant factor and the cause is believed to be due to infection by *Streptococcus longus* from the mouth, which becomes pathogenic because of the absence of normal

juice. The severity of the anæmia and the nervous symptoms are held to depend on the relative production of hæmolytic and neurotoxic bodies. Team work in the diagnosis of all the diseases dealt with is absolutely essential and the author strives to impress this truth in every chapter. There is no physician or surgeon who will not read this volume with profit and interest.

AN INTRODUCTION TO THE PRACTICE OF MEDICINE.—By William Boxwell, M.D. (Dub.), F.R.C.P.S. and F. C. Purser, M.D. (Dub.), F.R.C.P.I. Dublin, Talbot Press, Ltd., 1924. Pp. xv and 805. Price 30s. net.

At last someone has had the courage to publish a text-book of medicine which is really suitable for the average medical student. This excellent little book by Dr. Boxwell and Dr. Purser of Dublin contains about 900 pages, printed in a good sized type with liberal margins for the student's own notes. The substance of the book is by no means condensed and an attempt has been made to eliminate everything that is not of first class importance to the student. A book on these lines if specially written for Indian students would be of the greatest value.

Even as it stands Boxwell and Purser's book, if used in conjunction with a small manual of the special diseases of India, would fill the bill much better than any of the more elaborate text-books.

The intention of the authors is to give in a brief but explicit manner an account of what every young doctor must know about medical diseases. The book is far from being a complete account of medical diseases. It is still farther from being a book of reference, but it is just because it makes no pretence at being either of these things that it is so valuable. A specially useful feature of the volume is that it is written from the standpoint of the practitioner who has not the resources of special laboratories at his disposal, the tests and methods of examination which are described can be carried out by any doctor with a properly equipped consulting room.

The book is the product of men of mature and sound judgment who are capable of expressing themselves in an attractive and striking manner.

We shall be much interested to see whether the book is a success; from what has been said it is clear that it ought to be successful, but that is quite a different matter.

HANDBUCH DER TROPENKRANKHEITEN.—Prof. Carl Mense, Vol. III. Third Edition, 1924. Malaria and Blackwater Fever, by Prof. Dr. Hans Ziemann. Leipzig: Johann Ambrosius, Pp. 592, 152 illustrations and 7 coloured plates. Price 40 gold marks.

This very important volume is the most complete work in existence on malaria. It contains a complete summary of existing knowledge on malaria. The greater part of the book consists of a statement of the important facts in connection with malaria; the views of the numerous workers are stated in clear terms and a very voluminous list of the articles on each branch of the subject is given. The book is a veritable encyclopædia of malaria, but at the same time the author gives a critical summary in which his own views are stated.

The student will find himself rather bewildered at times by the very completeness of the book which is the result of years of painstaking work. It is especially as a book of reference that it has its greatest value and it is amazing that the Germans should still lead the world in the production of monumental treatises on tropical diseases when we consider how greatly their sphere of influence in the tropics has been contracted. As the author points out, malaria is no longer a tropical disease, it has spread with alarming rapidity in Russia and in other parts of Europe, and in spite of the completeness of our knowledge of its prevention it is still the greatest of the world's diseases. To review the book would necessitate a survey of the entire subject of malaria. There are some respects in which the book is not so helpful as in others; the dangers of intramuscular injections are not sufficiently emphasized, desensitization is not fully described, and too much space is occupied with the description of views and methods of minor importance. We must content ourselves with the statement that there is no aspect of the disease which is not dealt with in detail and that the book is indispensable to every specialist in malaria. The only pity is that there is not an English translation of a work of such completeness and importance. Even for those who have no knowledge of German the excellent tables and illustrations in themselves make the book a valuable acquisition. It should certainly find a place in every large medical library in India.

MODERN METHODS OF TREATMENT.—By Logan Glendenning, M.D. St. Louis: C. V. Mosby Co., 1924. Pp. 692. Price \$9.00.

THE chief feature of this book is that it deals with dull subjects in such a way as to make them exceedingly interesting. A general account of drugs is usually dry to a degree, but by confining his attention to the great drugs and by adopting the historical method of describing how they have come to occupy their present position the author has succeeded in making this section of the work very readable.

In the general account of the important drugs the author gives detailed instructions for their administration. Vaccines are dealt with in a very critical manner and only a few receive the hall mark of approval, these are the vaccines ordinarily used in the treatment of *B. coli* infections, aene, chronic bronchitis, cholecystitis and certain forms of tuberculosis.

The vaccines which are so commonly used in the prevention and cure of common colds are denounced as being worthless. Dietetics, hydrotherapy, climate, heliotherapy, massage, radiotherapy and psychotherapy are clearly and fully dealt with.

Various miscellaneous procedures such as blood transfusion, lumbar puncture, artificial pneumothorax, etc., are described in detail, so that even the general practitioner who follows the directions intelligently ought to be able to carry them out. About one-third of the volume is given up to the description of the treatment of particular diseases. This section is simple, clear and precise, perhaps at times a trifle too dogmatic as for example in the section on pneumonia in which the only drug treatment specified is ten drops of tincture of digitalis every four hours.

The general practitioner will be disappointed in finding no prescriptions for chronic bronchitis, this is a condition in which the patient demands medicine and in which medicine is often of great service to him. Other items might be criticised, but taking it on the whole the book is one which we can heartily recommend to every practitioner: it will not take the place of such a book as Whitla's "Dictionary of Treatment," but it will form an excellent complementary volume.

FUNDAMENTALS OF HUMAN PHYSIOLOGY.—By R. G. Pearce, B.A., M.D. and J. J. R. Macleod, M.B., F.R.S. Third Edition. St. Louis: C. V. Mosby Co., 1924. Pp. 349. Price, \$3.50.

THIS is an elementary text-book which gives a good general outline of the main principles of human

physiology. It might be read with profit by students who are entering on the study of physiology, but it does not contain enough to satisfy the requirements of any of the university examinations in medicine. The accounts of the vitamins and of the functions of the skin are insufficient even for a book of such small size, but on the whole the book can be heartily recommended to the student of elementary physiology.

A MANUAL OF DISEASES OF THE EYE.—By C. H. May, M.D. (New York), and C. Worth, F.R.C.S. (Eng.) Fifth Edition. London: Baillière, Tindal & Cox, 1924. Pp. viii + 480. Plates 22, coloured. Price 15s. net. Figs. 337.

THIS excellent book, now in its fifth English and thirteenth American editions, maintains its position as the most popular student's book on ophthalmology. It has been translated into Spanish, French, Italian, Dutch, German, Japanese and Chinese.

Looking through it, the large number of good illustrations both coloured and otherwise, and the careful way in which it has been kept up to date, strike one at once. At the same time the book is not too long and cumbersome for the ordinary medical student or general practitioner.

REFRACTION OF THE EYE.—By E. Clarke, M.D., F.R.C.S. Fifth Edition. London: Baillière, Tindal & Cox, 1924. Pp. iv + 251. Figs. 98. Price 8s. 6d. net.

THIS new edition of an excellent text-book has been re-written and brought up to date, especially with a view to the requirements of candidates for the D.O.M.S. examination. As before, the nature and results of "eye strain" are given great prominence, and the illustrative cases at the end are of great value to all students of this subject. The changes are not very great, and the size of the book is not materially increased by them, but they are of a very useful and practical character, and the book continues to be the best English book on this subject.

A POCKET BOOK OF OPHTHALMOLOGY.—By A. J. Ballantyne, M.D., F.R.F.P.S. (Glas.) Second Edition. Edinburgh: E. and S. Livingstone, 1924. Price 6s. net. Pp. 144.

THIS small book is intended for use by students attending lectures and clinical teaching in ophthalmology and is interleaved for note taking with blank paper. In scope it covers in a brief way the whole subject, but the absence of any illustrations, and the extreme brevity of its pathology render it unsuitable for students, except in connection with a good course of lectures and clinical demonstrations, when it should be very useful.

Correspondence.

PUBLIC HEALTH IN MADRAS PRESIDENCY.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—With reference to the paragraphs on "Hygiene and Public Health" on pp. 17 and 18 of the supplement issued with the February number of the *Indian Medical Gazette*, entitled "The Indian Medical Year, 1924," and particularly in connection with the statement that "Bengal has given the lead to other Provinces in the matter of utilising local self-governing bodies in the prevention of disease," I should like to draw the attention of your readers to the fact that in Madras Presidency, as early as October 1921, orders were issued regarding the formation of District Health Committees in each district (*vide* G. O. No. 1354-A. P. H., dated 19th October, 1921). A District Health Scheme, involving the appointment of a District Health Officer for each district, was introduced as an experimental measure in five districts in February 1922 (*vide* G. O. No. 165-P. H., dated 1st February, 1922), and a month or two later (*vide* G. O. No. 1096 L. & M., dated 21st

June, 1922, and No. 950-A. P. H., dated 6th July, 1922), Government ordered the old Provincial Cholera Parties to be disbanded and utilised the Sanitary Inspectors in these parties for providing a staff of trained Health Inspectors to work under the District Health Officers. This experimental scheme proved a complete success, and by G. O. No. 535-P. H., dated 27th March, 1923, a complete District Health Service was introduced with a District Health Officer and a number of trained Health Inspectors, varying from 8 to 14 in number, in every district in the Presidency. The experience of the last two years shows that the scheme has not only given a great stimulus to local public health endeavours, but has been of particular advantage in the prevention of epidemics arising from the large numbers of religious festivals which take place all over Southern India. Further details can be found in the Annual Reports of the Director of Public Health, Madras for the years 1921, 1922 and 1923, but I should be obliged if you would find space in your columns for this letter, so that any erroneous impression that may have been gathered might be removed. Since the days of Colonel King, I.M.S., it is perhaps not too much to say that Madras has always given the lead to the rest of India in matters sanitary.—Yours, etc.,

A. J. H. RUSSELL, M.A., M.D., D.P.H.,

MAJOR, I.M.S.,

Director of Public Health, Madras Presidency.

MEDICAL RELIEF IN RURAL AREAS.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—Dr. Nag's letter on the above subject in your issue for last December, though valuable, contains a suggestion therein to grant licenses to practice to unqualified allopathic practitioners,—a suggestion which hardly deserves any consideration at the present time, when hundreds of qualified medical men are turned out twice yearly by the medical colleges and schools in each Presidency.

Many of the newly qualified men, on finding the field overcrowded in the big cities, select good centres in rural areas for practice, where the field is undoubtedly great. But they find that the field is monopolised already by the unqualified, particularly allopathic practitioners, and above all by men who have served only as compounders for some little time to qualified medical men or in charitable dispensaries. The *mofussil* people have no idea at all as to the courses of study undergone, and the time and money spent by the qualified man in obtaining his qualifications. They think equally highly of any man, whether M.B., B.S.; L.M.S.; L.C.P.S.; or merely compounder, who manages to keep his dispensary crowded. Further, the unqualified practitioner, who is usually a compounder from the same locality, knows the local people well, and creates a favourable impression by the use of any means available, such as engaging touts and commission agents, winning over influential men of the locality of different castes and creeds, means which are beneath the dignity of a qualified man to employ. So much so, that, once his position is secure and his practice established, the unqualified quack undertakes cases of all sort for treatment, practises medicine, surgery and midwifery alike; freely uses all sorts of poisons, both those in and others without the British Pharmacopœia; gives intravenous injections, and manages to create an impression on the ignorant people of the locality that he is equal to or even better than the qualified man. His serious and even fatal mistakes pass unnoticed and unreprieved.

The public, finding that the qualified man does not fare well, gain a low opinion of his abilities, and his position is doubly unfortunate as he cannot resort to the unscrupulous means of the quack.

The present generation of *vaidyas* and *hakims* is not held in as high esteem by the public as were their forefathers, and they do not constitute serious rivals to the qualified medical man. Also they use for the most

part harmless indigenous drugs; their fees are very low, and they may even be of some benefit to the poor.

The Medical Registration Act, though imposing restrictions on those registered, does nothing to protect their interests and dignity. Under such circumstances many qualified medical men do not care to get themselves registered, whilst others are seriously thinking of withdrawing their names from a register which they find to be useless and impotent in their own interests. The rapidly growing number of qualified medical men in this country would be very grateful to you if you would raise your powerful voice (1) to induce Government to take urgent steps to protect the interests and dignity of the whole medical profession in this country; and (2) to appeal to the existing medical organisations in each Presidency and Province to start branches in the *mofussil* for the same purpose.—Yours, etc.,

N. F. DOCTOR, M.B., B.S.

NAWSARIJ,
5th January, 1925.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—On reading Dr. Nag's letter on medical relief in rural areas in your issue for last December, I recalled a tragedy which happened here last year. A *vaidya* was called in to attend a patient with menstrual disorder, and prescribed a mixture containing aconite; making the medicine up with his own hands. He was so proud of this mixture, which he had taken two or three days to prepare, that he insisted on several men in the locality tasting it and also took a considerable dose of it himself. An hour later symptoms of aconite poisoning set in. The *vaidya* died after some hours of suffering; the others recovered, as they had only had a small dose.

The deplorable conditions in *mofussil* villages could not be better illustrated than by the possibility of such cases occurring.—Yours, etc.,

S. D. NARAIN, L.M.P.

DHAKA, CHAMPARAN,
20th January, 1925.

CINCHONA FEBRIFUGE IN MALARIA.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—In continuation of my letter on p. 643 of your issue for last December, regarding the therapeutic value of cinchona febrifuge in malaria, and the formula utilised by us, I have much pleasure in enclosing a short report by Sub-Assistant Surgeon Bankim Chandra Ganguly, one of the Sub-Assistant Surgeons employed on this railway, which is a gratifying testimony, not only to the value of the cinchona formula, but to the results which may be obtained by wise and loyal co-operation between the medical and operating staffs. The report runs as follows:—

"The formula has been used by the station staffs of all except two or three of the thirty stations concerned as a prophylactic against malaria, and generally with very satisfactory results. When taken on an empty stomach—especially in very debilitated conditions or in the very serious biliary type of malaria—the mixture may cause some uneasiness, nausea, giddiness or dizziness for the first day, until the magnesium sulphate in it opens the bowels. This can be avoided by relieving the bowels if constipated before the mixture is commenced. Most of the station-masters on this section have followed the directions which were published in the *Railway Gazette*.

At Sonarpur, the most notoriously malarious station in my section and where the Government of Bengal has started a malaria research laboratory under the Director of Public Health, we tried the mixture especially to test its efficacy. In this I was loyally helped by Sub-Assistant Surgeon R. N. Singha, of the Public Health Department, and by the station-master, R. N. Rakshit. Amongst over 300 railway population in this station I have had to attend to only two cases of fever, and there have been no more sick reports during the current

malaria season, which was otherwise one of the worst which I have ever experienced. I confidently believe, as do most of the staff who have used it, that the formula is superior to any other in prophylaxis, and superior to quinine in chronic cases of malaria fever as a remedial measure."—Yours, etc.,

T. H. BISHOP,
Chief Medical Officer,
Eastern Bengal Railway.

CALCUTTA,
27th January, 1925.

MERCUROCHROME IN MALARIA.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—There has been much on the new drug, Mercurochrome, during 1924 in the *Journal of the American Medical Association*. It has been generally used for its bactericidal effect in cases of septicæmia; also for the treatment of local infections and in tubercular sinuses. Recently I have come across an extract in a daily paper stating that Mercurochrome has been largely used by Dr. George H. Hooper of Tampico, Mexico, in the treatment of malaria, by injection, with what are stated to have been admirable results; cases of more than a year's duration having cleared up in 48 hours, and others resistant to quinine treatment, cured. I write to ask whether any of your numerous readers has had any experience of this drug in malaria, and as to its efficacy or otherwise in that disease.—Yours, etc.,

HARI CHARAN GUPTA.

MAKTAGACHA,
15th January, 1925.

GASTRO-JEJUNOSTOMY WITH A BAMBOO CLAMP.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—A male patient, aged about 35 years, a Kapu by caste, came to the London Mission Hospital, Kamalapuram, in July 1924, suffering from abdominal pain with discomfort and vomiting, of 6 or 7 years' duration. On examination of the case a diagnosis of pyloric stenosis was made and a date fixed for operation. As the equipment at this branch hospital was inadequate for the operation, a message was sent to the main hospital at Jammalamadugu asking for the loan of a three-bladed clamp as is usually used in gastro-jejunosomy. This failed to arrive in time, however, and a three-bladed clamp was improvised from bamboo, sterilised and used at the operation instead. The wound healed by first intention and the patient was discharged cured five weeks later.

There are probably many instances where the meagre equipment of branch hospitals could be temporarily supplemented with improvised instruments manufactured from bamboo.—Yours, etc.,

JOHN MOSES, L.M.P.

KAMALAPURAM, CUDDAPAH DIST.,
21st January, 1925.

THYROID EXTRACT IN THE TREATMENT OF NEPHRITIS.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—Allow me to invite your attention to the following extract from the *Journal des Praticiens*, September 13, 1924, p. 601. I shall be very grateful if any of your numerous readers will kindly let me know their experience:—

"N. Fiessinger and H. Leboucher draw attention to a recent article by A. Guérin on the action of thyroid extract on the kidney, and make a valuable survey of recent literature referring to thyroid medication in nephritis, which was apparently first suggested by Heinsheimer in 1895. L. Thevenot has employed in the treatment of nephritis, not the ordinary thyroid extract, but thyrotoxin, the extract deprived of the toxic lipoids, using it in doses of 25 milligrammes, twice daily.

Epinger has insisted on the diuretic rôle of thyroid extract, and states that it is an ideal diuretic in renal affections, as it is an extra-renal diuretic, without any irritant effect upon the kidney; he employs it in doses of 0.03 grams daily of the dry extract of the gland, increasing the dose up to 1.2 or 1.8 grams daily. Campanacci has treated successfully three cases of renal anasarca with thyroid extract; details of these cases are given. Wenckebach has pointed out that in his experience cases of severe œdema resistant to diuretic treatment are cases of hypothyroidism. Drs. Fiessinger and Leboucher put forward the following conclusions: Thyroid extract, in doses of 0.03 to 1.5 grams or grs. $\frac{1}{2}$ to xx (of the dry extract) may be given four to six times in twenty-four hours in certain cases of nephritis with severe œdema, without hypertension, and with large amounts of albumen in the urine, when the patients are resistant to diuretic and dietary treatment; this method of treatment should be continued for three weeks and may give remarkable results."—Yours, etc.,

S. J. EAPEN, M.B., Ch.B. (Edin.).

SUNDRESWARA VILLAS,
ROYAPETTAH, MADRAS,
19th January, 1925.

PHARMASOL COLLO-CALCIUM.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—We have had forwarded to us from London copies of a letter sent you by Dr. Edward E. Prest, M.A., M.D., relative to our advertisement for Pharnasol Collo-Calcium.

We sincerely regret that the quotation from Dr. Prest's article was used without qualification in our advertisement. When the article was published the Anglo-French Drug Co., Ltd. were the sole export agents for Crookes' Collosols and were manufacturing them for export in the laboratories in France. This particular article was then filed for advertising purposes and, unfortunately, used in error in our advertisement for the new Pharnasol Collo-Calcium.—Yours, etc.,

THE ANGLO-FRENCH DRUG CO.,
(EASTERN), LTD.

YUSUF BUILDING,
CORNER CHURCHGATE STREET,
BOMBAY,
28th January, 1925.

VON HEYDEN 471.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—With reference to the supplement included with the February issue of the *Indian Medical Gazette* and to the leading article in the *Gazette*, p. 73, *re kala-azar*, I shall be glad if you will kindly permit me to state I am the sole Indian representative of Messrs. Allen & Hanburys, Ltd., London, distributing agents for Von Heyden Compound 471. In the leading article you mention that the available supply of Von Heyden Compound 471 in India is insufficient to meet requirements. It will, however, interest medical men to know that Von Heyden 471 in ampoule form is now being imported by many of the leading chemists and medical stockkeepers in Calcutta, and I myself have available, at this office, a large supply of this compound in 0.2 and 0.3 grammic ampoules, and arrangements have been made for further supplies to come forward regularly, so that medical men interested in the treatment of kala-azar should experience no difficulty in obtaining supplies. I should, therefore, esteem it a great favour if you would kindly give this information in the next issue of your journal, also that I shall be glad to forward a reprint of the article by Dr. L. E. Napier, M.R.C.S., L.R.C.P., which appeared in the *Indian Medical Gazette* in December 1923, to any medical man on application to me at Block E. 2, Clive Buildings, Calcutta.—Yours, etc.,

A. H. P. JENNINGS.

P. O. Box 2193, CALCUTTA,
13th February, 1925.

Service Notes.

APPOINTMENTS AND TRANSFERS.

Colonel C. H. Bensley, I.M.S., to be Honorary Physician to the King *vice* Colonel Bhola Nauth, C.I.E., I.M.S., retired from 13th April 1924.

Lieutenant-Colonel R. P. Wilson, V.H.S., F.R.C.S., I.M.S., Professor of Surgery, Medical College, Calcutta, is appointed to officiate as Surgeon-General with the Government of Bengal, during the absence on leave of Major-General R. Heard, C.I.E., K.H.S., M.D., I.M.S.

The services of Lieutenant-Colonel E. C. Hodgson, D.S.O., I.M.S., an officer of the Medical Research Department, are placed at the disposal of the Government of Assam, with effect from the 26th December 1924, for appointment as Officiating Director of the Pasteur Institute, Shillong.

Lieutenant-Colonel A. H. Proctor, I.M.S., Civil Surgeon, Darjeeling, is appointed to act as Surgeon-Superintendent, Presidency General Hospital, Calcutta, *vice* Lieutenant-Colonel E. E. Waters, I.M.S., granted leave, or until further orders.

Lieutenant-Colonel A. C. MacGillchrist, M.D., I.M.S., is appointed to be Professor of Physiology, Medical College, Calcutta, *vice* Major J. A. Shorten, M.B., M.R.C.P., I.M.S.

The Viceroy and Governor-General has been pleased to make the following appointment on His Excellency's personal staff, with effect from the 17th December 1924:—

To be Honorary Surgeons.

Lieutenant-Colonel J. C. H. Leicester, M.D., F.R.C.S., F.R.C.P., I.M.S., *vice* Lieutenant-Colonel R. McCarrison, C.I.E., M.D., F.R.C.P., I.M.S., tenure expired.

Major J. B. Lapsley, M.C., I.M.S., Officer-in-Charge, Medical Store Depot, Madras, is appointed to officiate as Assistant Director-General, Indian Medical Service (Stores), *vice* Lieutenant-Colonel G. G. Hirst, I.M.S., granted leave.

Major J. D. Sandes, M.D., I.M.S., officiating Civil Surgeon, is transferred from Serampore to Hooghly, *vice* Lieutenant-Colonel E. O. Thurston, I.M.S., granted leave.

Major Sandes is also appointed to hold medical charge of the civil station of Serampore in addition to his own duties, until further orders.

Major P. F. Gow, D.S.O., I.M.S., Civil Surgeon of Rajshahi, is appointed to act as Second Professor of Midwifery, Medical College, Calcutta, *vice* Major V. B. Green-Armytage, I.M.S., granted leave or until further orders.

Major J. R. D. Webb, O.B.E., D.P.H., I.M.S., is appointed permanently as Health Officer, Simla, with effect from the 5th July 1923.

Captain F. R. Thornton, M.C., I.M.S., is appointed as Civil Surgeon, Coorg, with effect from the date on which he takes over charge from Major F. C. Fraser, I.M.S.

LEAVE.

Major-General R. Heard, C.I.E., K.H.S., M.D., I.M.S., Surgeon-General with the Government of Bengal, is granted 8 months' leave on average pay, with effect from the 13th January 1925.

Lieutenant-Colonel F. A. F. Barnardo, C.I.E., C.B.E., M.D., F.R.C.S.E., I.M.S., Principal and Professor of Medicine, Medical College, Calcutta, and First Physician, College Hospitals, is granted leave for two months and twenty-two days, with effect from the 25th March 1925 or from any subsequent date on which he may avail himself of it.

Lieutenant-Colonel E. E. Waters, M.D., M.R.C.P., I.M.S., Surgeon-Superintendent, Presidency General Hospital, Calcutta, is granted leave for eight months with effect from the 25th March 1925, or from any subsequent date on which he may avail himself of it.

Lieutenant-Colonel G. G. Hirst, I.M.S., Assistant Director-General, Indian Medical Service (Stores) is granted leave for four months and leave under military rules for the remaining period up to a maximum of 8 months in all, with effect from the 1st March 1925 or any subsequent date on which he may avail himself of it.

Major V. B. Green-Armytage, I.M.S., Second Professor of Midwifery, Medical College, Calcutta, is granted leave for seven months, with effect from the 15th March 1925 or from any subsequent date on which he may avail himself of it.

Major F. A. Barker, O.B.E., I.M.S., Senior Medical Officer, Port Blair, is granted leave for one month and fifteen days with effect from the 2nd March 1925, or such later date as he may avail himself of it, and on the expiry thereof his services are replaced at the disposal of the Government of Madras.

Major F. C. Fraser, I.M.S., Civil Surgeon, Coorg, is granted leave on average pay for eight months and in continuation leave on half average pay for ten months with effect from the 1st February 1925 or date of relief.

Captain J. C. De, I.M.S., has been granted by the High Commissioner for India leave for a further period of three months in extension of the combined leave granted to him.

RETIREMENT.

Lieutenant-Colonel A. E. Walter, O.B.E., I.M.S. Dated 1st February 1925.

RESIGNATIONS.

Captain Watts-Taylor, I.M.S. Dated 1st December 1924.

The undermentioned officers of the Indian Medical Service relinquished their acting or temporary ranks, subject to His Majesty's approval, with effect from the dates specified:—

Lieutenant-Colonel H. Boulton, C.B.E. Dated 16th December 1920.

Lieutenant-Colonel F. A. F. Barnardo, C.I.E., C.B.E. Dated 15th March 1920.

Major C. A. Godson, M.C. Dated 3rd January 1920.

Major H. R. B. Gibson. Dated 10th June 1920.

Major P. F. Wernicke (now F. P. Warwick, D.S.O.). Dated 2nd April 1920.

Major H. B. Scott, O.B.E. Dated 6th August 1920.

Major D. F. Murphy, M.C. Dated 28th July 1920.

Captain J. P. Huban, O.B.E. Dated 18th November 1920.

Captain J. B. Vaidya. Dated 12th May 1920.

Major G. McG. Millar, O.B.E. Dated 10th February 1919.

Major W. L. Harnett. Dated 22nd October 1921.

Major G. Holroyd. Dated 13th September 1920.

Major E. B. Munro, O.B.E. Dated 9th March 1921.

Major A. N. Dickson, M.C. Dated 6th December 1919.

Captain G. H. Mahony. Dated 5th September 1919.

Major A. G. Coullie. Dated 4th December 1919.

Major J. B. Hanafin, C.I.E. Dated 24th August 1919.

Major C. H. Fielding. Dated 22nd May 1920.

Major J. V. Macdonald, M.C. Dated 9th May 1919.

Major P. B. Bharucha, D.S.O., O.B.E. Dated 24th August 1920.

Major J. B. Hance, O.B.E. Dated 10th October 1919.

Captain R. Sweet, D.S.O. Dated 1st April 1921.

Captain W. R. Stewart. Dated 6th April 1919.

Captain K. R. Batra. Dated 4th May 1921.

Captain W. P. Hogg, D.S.O., M.C. Dated 10th August 1920.

Captain P. A. Dargan. Dated 31st December 1921.

NOTES.

OSMO-CALAMINE.

We have lately received from Messrs. Thomas Morson and Son, Ltd. a sample of one of their new products, "Osmo-Calamine." The uses of calamine, especially in connection with skin diseases, are so

numerous that the introduction of a very high grade of calamine, produced by an electro-osmotic process, is to be welcomed. Reports on examination of the product record that, when used in lotion form, Osmo-Calamine took nearly 24 hours to settle down from suspension, and that the precipitate was so light that it filled nearly half the bottle. Recently, supplies of raw material for the production of calamine have only been available with difficulty, and it is stated that much of the calamine on the market at present contains grit and other impurities. Morson's Osmo-Calamine is a most exceptionally fine powder, absolutely free from grit, and almost if not quite impalpable to the feel.

This product should prove exceptionally useful in the treatment of private cases of skin disease. At the time of writing (January, 1925), the "prickly-heat season" is off; but Morson's Osmo-Calamine is of such exceptionally fine and light texture that it will certainly be an interesting product with which to experiment in the treatment of that distressing complaint; whilst its uses in the various fields of therapy of skin diseases are obvious. The Indian agent is R. Krishnaswami, P. O. Box No. 500, Bombay.

AMBRIODIN.

"AMBRIODIN" was introduced some years ago by the Centaur Chemical Co., Bassishaw House, Basinghall Street, London, E.C.2, as a remedy for use in cases of epilepsy, neurasthenia, insomnia, whooping cough, asthma, and kindred complaints. Its composition, as stated by the *Lancet*, is ammonium bromide 5 grs., potassium iodide 1 gr., combined with a laxative, per tablet, and the formula is therefore a well known one, and one in general use. This product differs from many others in that it is not advertised to the public, but only to the medical profession, and that its composition on analysis agrees with its stated formula. The preparation has already been favourably reported on by the *Lancet*, the *Journal of Clinical Research*, and the *Prescriber*, so that any further recommendation is unnecessary. The tablets are put up in two forms; uncoated and soluble in water, and sugar-coated. The dose in a case of epilepsy is from 2 to 6 tablets twice daily, on rising in the morning and at bed-time, whilst an additional table of diet and general instructions is also given. The price varies from 8s. 6d. per bottle of 100 tablets to 78s. 6d. per bottle of 1,000 tablets.

This preparation is in general use in various institutions in Great Britain; it is stated that it has proved efficacious in cases of epilepsy where other remedies have apparently failed; whilst its formula is an unimpeachable one.

"TABLOID" HYPODERMIC INSULIN HYDROCHLORIDE (STERILE).

INSULIN has been successfully prepared by Messrs. Burroughs Wellcome & Co., as one of their well-known "Tabloid" products, each of which is equivalent to one average dose of 10 clinical units and which, when dissolved in 0.5 c.c. of sterile distilled water, is equivalent to an equal volume of standard insulin.

"Tabloid" Hypodermic Insulin Hydrochloride (Sterile) is prepared under conditions approved by the British Medical Research Council and has been submitted to exhaustive clinical tests. It has been found to be equal in all respects to standard insulin. The "Tabloid" product offers several advantages, not least of which are ensured sterility, stability and accuracy of dosage. They are convenient to administer, are readily portable, and may be dissolved within the syringe.

"Tabloid" Hypodermic Insulin Hydrochloride (Sterile) is issued in two packings: cartoons containing 10 products in one tube and cartoons of 10 tubes, each containing one product.

"MODERN ORGANO-THERAPY."

We have received from Messrs. Burroughs, Wellcome & Co. a very attractive little handbook with the above title, which they will be glad to send to medical men (only) upon request. We are to-day just beginning to realise the extreme importance of endocrine functions in connection with tropical diseases. For instance the severe cachexia of malaria or of kala-azar is usually associated with both thyroid and suprarenal deficiency, and both glandular extracts are worth trial in such cases, especially in the "antimony-resistant" kala-azar case. Much of tropical debility is either dependent upon or associated with endocrine defect. As yet our knowledge on the subject is vague and scanty, but there can be no doubt of its importance in tropical medicine, and it is probable that the next few years will see much attention devoted to it.

In the meantime, the practitioner who wishes to prescribe endocrine glands in tropical practice must understand clearly the functions and actions of such glands and the indications for prescribing them; otherwise he will go in for shot-gun prescriptions which may do nothing but harm. In its simple and clear presentation of the facts underlying endocrine therapy as we know it to-day, this little handbook is very useful. It is also admirable for the restrained and careful manner of its compilation; it makes no exaggerated claims for organo-therapy; unlike other works on the same subject, it does not claim that the endocrine glands dominate personality, or that in the continued use of ovarian extract lies the secret of eternal youth and charm. We can cordially recommend a study of its pages to the medical profession in this country.

I. M. S. DINNER.

The Annual Indian Medical Service Dinner will be held in London at the Trocadero Restaurant on Wednesday, 17th June 1925. Officers wishing to attend should communicate with Colonel J. J. Pratt, 63, Addison Road, Kensington, London, W.C.

Publishers' Notice.

SCIENTIFIC Articles and Notes of interest to the profession in India are solicited. Contributors of Original Articles will receive 25 reprints of the literary pages of the "*Gazette*" gratis, if asked for at the time of submitting their manuscripts.

REPRINTS OF THE ARTICLE CONCERNED (ONLY), IN PLACE OF REPRINTS OF THE WHOLE OF THE LITERARY MATTER OF THE ISSUE, CAN BE SUPPLIED ON PAYMENT IF ASKED FOR AT TIME WHEN ARTICLE IS SENT IN. BUT AS THESE HAVE TO BE MADE UP SEPARATELY, THEY ARE NECESSARILY DELAYED.

Communications on Editorial Matters, Articles, Letters and Books for Review should be addressed to THE EDITOR, *The Indian Medical Gazette*, c/o Messrs. Thacker, Spink & Co., P. O. Box 54, Calcutta.

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Annual Subscription to "*The Indian Medical Gazette*," Rs. 16 including postage, in India. Rs. 18 including postage, abroad.

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Original Articles.

GIANT URTICARIA.

By HUGH W. ACTON,

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(Being a paper read at the Medical Section of the Asiatic Society of Bengal on the 11th February, 1925.)

THE disease "giant urticaria" was first described accurately by Quincke in 1882, and is sometimes called after him, Quincke's oedema. The original view, and the one commonly held by most dermatologists, is that the disease is due to a vasomotor neurosis, and in text books on skin diseases it is called an angio-neurotic oedema. The oftener I hear the term "neurosis" the less I like it and now avoid it, as the patient is and feels ill, whilst his medical adviser cannot find the root cause of the disease, and so labels his patient neurasthenic. During the last three years Major Chopra and myself have been working amongst these diseases due to a peculiar sensitiveness which individuals develop towards certain protein bases. In 1923 our first work dealt with the causation of asthma, and in 1924, "on some of the factors concerned in individual susceptibility." This year we have completed our observations on epidemic dropsy and beriberi. In the dermatological clinic one came across a number of cases of chronic urticaria and giant urticaria, where the same sensitiveness was seen towards certain foods. The various pressor bases which we have studied act in two ways; (a) on the involuntary muscular fibres, dilating or constricting the capillaries, and (b) increasing or diminishing the cell permeability of the endothelium. I will now show you the dermal test on myself, and demonstrate the action of trimethylamine, a volatile amine obtained from rotten herrings. The dermal test is done as follows:—The skin is sterilised by alcohol and with a knife lightly scraped short of bleeding, so as to open the prickle cell layer. A drop of the test solution is now placed on the scraped area. In a couple of minutes you will observe an area of hyperæmia, i.e., dilatation of the capillaries all round the site. In about five minutes when the solution is removed a definite wheal of urticaria will be produced, due to the increased permeability of the endothelium which allows an abnormal amount of lymph to exude into the tissues. The reason that I am sensitive to trimethylamine is that I am also sensitive to a volatile amine in sardines, as I can only eat this fish when they have been well fried, so as to get rid of the volatile amine. Now observe

the converse action produced by a drop of a 1 in 1000 solution of adrenalin hydrochloride, the vessels will be constricted, so that the zone of hyperæmia will first disappear, and gradually the wheal will be absorbed in a few minutes' time.

These bases have different iso-electric points; compare adrenalin which works best on the isolated uterus of a guinea-pig at a pH of 7.2, whilst trimethylamine works best at a pH of 8 (Acton and Chopra, 1925). We have further shown that the pH of the different tissues of the body varies. The brain and liver are the most acid organs in the body with a pH about 6. When the iso-electric point of the base coincides with that of the tissue, it exerts a maximum effect at that site, and so displays the phenomenon that is observed when drugs are selected by certain tissues. Some of these pressor bases functionate as ampholytes, i.e., acting at one time as an acid and at another time as a base; producing in one place constriction and diminished permeability, and at another relaxation and increased permeability. Thus adrenalin as you have seen constricts the skin vessels and diminishes their permeability, and probably acts as an acid; but in the vessels of voluntary muscles (tissues which are acid) it acts as a base causing dilatation and an increased permeability. In the production of urticaria, the same kind of effect is seen; there are bases that cause an increased permeability of the endothelium of the capillaries, so that wheals are produced in the skin;—the common nettle-rash or urticaria. On the other hand, certain bases cause the same effects, but only in the vessels under the deep fascia, producing a deep oedema,—the giant urticaria or Quincke's oedema,—which may involve a limb, or what is more serious the pharynx and larynx and cause death by oedema of the glottis. This catastrophe can fortunately be averted by the use of adrenalin and pituitrin.

The reason why I have selected this subject for my paper is that the disease is very much more common in India than in Europe, and it is very frequently mis-diagnosed as teno-synovitis, filarial lymphangitis, or chronic erysipelas. Quincke, Osler and others have drawn attention to the frequency with which these cases run in families, and it brings out the relationship between heredity and the occurrence of the endocrine defects that is observed in all these diseases due to the effects of pressor bases.

Definition.—We can now define giant urticaria or Quincke's oedema, as an urticaria produced under the deep fascia by certain bases derived from the food, which only show their effects in those individuals in whom the defence mechanism is low. This defect in the defence mechanism may be inherited or acquired.

Ætiology.—The disease is commoner amongst Europeans than Indians, but whether this is due to the fact that the cases amongst Indians are mis-diagnosed as filarial lymphangitis remains to

be further investigated by us. My attention to this disease amongst Indians was first drawn by two cases in which the scalp was involved by the œdema. Dr. Sunder Rao, who is investigating filariasis at our School, is carefully looking out for this possibility.

I am inclined to think that it is more common in Europeans owing to the depression of the endocrine functions by long residence in a climate like Calcutta. In Europeans the diagnosis is easier, as one is guided by the fact that at least 12 to 15 years' residence in an infected area is necessary before signs of lymphatic obstruction due to filariasis develop in them. There does not appear to be any difference in the sex distribution, as males are as often affected as females. In over half these cases a history was given that one of these food sensitisation diseases was present in the family, e.g., asthma, urticaria, etc. The age incidence is peculiar; the disease appears in very young children from 15 months to 2½ years, or in adults between the ages 30 to 45. In children the sensitiveness may be due to hereditary influences, but is more commonly due to living for too long a time on a whole milk diet, or when new foods are added to the diet. Both my cases in young children were due to milk, and what probably happens is that digestion in the stomach during early life is done by rennin, but later on in life when the pepsin and hydrochloric acid mechanism is fully developed the end-products of digestion are different at these two ages, and so sensitisation may develop. In adults, sensitiveness may occur from taking an excessive amount of the particular food; thus a Nepalese patient was free in Nepal where he only ate rice, but developed urticaria in Calcutta where he ate bread instead of rice, and we found that he was sensitive to wheat.

It may also develop from the infrequent use of a food, such as pork or beef. I have seen two cases due to beef in planters who have to live almost wholly on chicken when on their gardens. Again it may be seasonal, when it is associated with certain fruits, fishes, etc., which come into the market for only a short time during the year. At the age of 30 to 45 the internal defence mechanisms may be impaired, e.g., the functions of the liver by alcohol, the thyroid and adrenal functions by syphilis, alcohol, or climate and overwork. Three of my cases were *Entamœba histolytica* carriers. Acton and Knowles (1924) considered that occasionally the intestinal flora may be concerned in the reduction of some of the amino-acids of protein digestion into toxic bases, and in these three cases the liver was also enlarged owing to amœbic hepatitis. This disease is seen amongst sympathetotonic individuals, and these people are very sensitive to adrenalin injections; small doses of *m. iii* to *m. iv.* injected intramuscularly will cause the heart to palpitate if given daily for 2 or 3 days.

Symptoms and signs.—The onset is usually sudden, coming on about 6 hours after the ingestion of the particular food, so that it is seen about 2 to 4 in the afternoon or at the same time at night, i.e., after the two principal meals of the day. The adrenal functions are at their lowest ebb during the early hours of the morning, and hence the frequency of the attacks coming on at this time. The arm is more commonly affected, and usually only one arm at a time; the limb is swollen, and feels heavy and the movements of the fingers are restricted. There is a good deal of pain and tenderness when the œdema occurs under dense fascia like the palms or scalp. As a rule there is no superficial urticaria or pitting of the skin on pressure, and sometimes the lymphatics draining the area may be dilated and congested, as in streptococcal cellulitis, but to a lesser extent. On the face, the main effect is seen in the lips and the eyelids, which are thick, swollen and puffy, and in case No. 5 of the Table there were large blebs containing sterile serum in the prickle cell layer. On the trunk, large plaques are seen under the deep fascia of the chest and abdomen and are usually associated with superficial urticaria. On the scalp, large plaques are formed on the top of the head or under the deep fascia of the occipital region; they are very painful and tender. On the legs, large plaques of solid œdema are seen and are often associated with an intensely irritable condition of the skin.—*Urticaria, ferox*—when the patients tear the skin of the legs by their scratching in order to relieve the irritation. The condition may last for a few hours or persist for weeks if due to some common food.

During these four years I have seen about 40 cases of this disease, and in Table I, I give the records of 20 cases that have been worked out fully during the last two years.

The signs of the disease are the solid œdema under the deep fascia; there is no enlargement of the lymphatic glands as is sometimes seen in filarial lymphangitis. Eosinophilia is more marked than in filariasis, counts varying from 20 to 60 per cent. of eosinophiles are not uncommon in the disease. On pressing the skin deeply with the thumb-nail and making a line on it, the white adrenalin line is seen. In superficial urticaria, wheals are sometimes produced, as in dermatographia. The dermal tests are much less marked in giant urticaria than in superficial urticaria.

Pathology.—We have seen that the disease is produced by certain pressor bases derived from the proteins of the food, which cause dilatation of the capillaries and an increase in the permeability of the endothelium lining the capillaries, so that hyperæmia and tissue œdema are produced as the result of their action. In giant urticaria these bases exert their main action on the vessels lying under the deep fascia thus giving rise to a solid œdema, but there is no pitting on pressure as the superficial vessels are not

usually affected, and the œdema is under the deep fascia. There are, therefore, three factors concerned in the disease.

(i) Pressor bases derived from the proteins, causing dilatation and increased permeability of the vessels under the deep fascia.

TABLE I.

| No. | Race. | Sex. | Age. | Food Sensitiveness. | Duration. | Site of disease. |
|-----|-----------|---------|-----------------|---|--|----------------------------------|
| 1 | European. | Female. | 1 $\frac{3}{4}$ | Milk + + + | 3 months. | Alternately arms and legs. |
| 2 | " | Male. | 47 | Aspirin. | One day : previous attack 3 months before. | Deep plaques on face and trunk. |
| 3 | " | Female. | 24 | Condensed Milk + + | One month. | Face, arms and legs. |
| 4 | " | Male. | 43 | <i>E. histolytica</i> carrier. Beef + + + Chicken + + Eggs + | 3 weeks. | Arms. |
| 5 | " | Female. | 42 | Pork + + + | 4 attacks in 2 years : each lasted a week. | Face. |
| 6 | " | " | 41 | Eggs + + + | 3 weeks. | Arm. |
| 7 | " | " | 32 | General Sensitiveness. Fish + + Chicken + + Eggs + + | 4 weeks. | Arm. |
| 8 | " | " | 33 | Potato + + + | 6 weeks ; also Scleroderma. | Arms, and plaques on the trunk. |
| 9 | " | Male. | 47 | Fowl group. Chicken + + + | 10 days. | Arms. |
| 10 | " | " | 43 | Mutton + + + | 6 months on and off. | Mastoid and occipital region. |
| 11 | " | " | 35 | General Sensitiveness. <i>E. histolytica</i> carrier. | 2 months. | Scalp. |
| 12 | " | Female. | 31 | Tinned herrings + + | 2 weeks. | Palms and fingers of both hands. |
| 13 | " | Male. | 28 | Milk + + + | On and off for 2 years. | Arms. |
| 14 | " | Female. | 32 | Wheat + + + | 2 months. | Arms. |
| 15 | " | Male. | 35 | Chicken + + + | 2 weeks. | Arms and trunk. |
| 16 | " | " | 32 | Tinned fish. Salmon + + + Lobster + + + | 2 weeks : previous attack. | Legs. |
| 17 | Indian. | Female. | 24 | <i>E. histolytica</i> carrier. | 2 months. | Scalp ; also horse asthma. |
| 18 | " | Male. | 32 | Fish, Hilsa + + + Rohu + + + | 3 months. | Arms and scalp. |
| 19 | European. | Male. | 41 | General Sensitiveness. Beef + + + Chicken + + | On and off for 6 months. | Plaques on abdomen. |
| 20 | " | Female. | 33 | Chicken + + + | 2 months. | Arm. |

(ii) A defect in the internal defence mechanism, due to diseases of the gut, liver or lowering of the endocrine functions.

(iii) Hyper-sensitiveness of the sympathetic nerves, a condition known as sympathicotonia.

In normal individuals, the effects of these bases are not seen, as they are dealt with by the various internal defence mechanisms.

Differential diagnosis largely depends upon the site involved by the œdema, especially if it is a true giant urticaria. Sometimes the lesions are of a mixed type when the superficial skin lesion, i.e., nettle-rash, readily reveals the nature of the disease. When the œdema affects the arm, usually it affects one arm only. I have seen it mistaken for (i) teno-synovitis. This case was diagnosed by a physician, then operated upon, and no pus was found; the case proved to be a giant urticaria due to eggs. (ii) Filarial lymphangitis in Europeans: the rule here is that at least 12 years' continuous residence in an infected locality is necessary before they develop lymphangitis, which would help in the diagnosis. In Indians the diagnosis is more difficult, eosinophilia is present in both diseases, but more marked in giant urticaria; the absence of microfilariae from the peripheral blood at night would not help, as at least 90 per cent. of the filarial lymphangitis cases have no microfilariae in their blood. The dermal tests help in these cases. (iii) When giant urticaria involves the face, the cases are usually diagnosed as chronic erysipelas; these cases are very puzzling if seen a few days after the attack, when blebs form and get infected by streptococci. Sometimes the lips only are involved, when one would have to exclude the various types of cheilitis, angular due to *Morax-Axenfeld's* bacillus, streptococcal, or syphilitic. On the legs it is more often of the plaque type, but when it involves both legs the cases have to be differentiated from epidemic dropsy and filarial lymphangitis. I have seen œdema of both legs, the case clinically resembled epidemic dropsy; in this case rice was eaten very occasionally, and the patient gave a very marked reaction to the dermal tests.

Prognosis.—The cure is certain if one can find the cause, and if it happens to be an unimportant food, eliminate it from the diet. The danger used to be death from œdema of the glottis. Thus Osler states that out of 141 persons in seven generations, 49 were affected, and 12 died of œdema; whilst Bullock (1909) states that out of 170 cases 39 died of œdema of the glottis. Now with the proper use of adrenalin and pituitrin this danger can be averted in most cases. The cases with general sensitiveness are more difficult to cure, and it means a lot of work to find the cause.

Treatment, General.—We can no longer regard the disease as a neurosis, it is due to some poison derived from the foodstuffs. The first thing we have to do is to find the cause and here the dermal tests are invaluable as this is

practically the only method to recognise the particular food, and then give the patient directions as to his diet. Recently I saw a case where the medical attendant advised the avoidance of all red meat; the patient had to live on chicken; the urticaria got much worse, and on testing him with these dermal reactions, I found he was very sensitive to chicken. Good food, the avoidance of too much alcohol, and often a change of climate if the patient is run-down will do a great deal to raise the power of the internal defence mechanism. When there is sensitiveness to three or four important foods, such as milk, eggs, wheat, etc., these should be restricted as much as possible during the course of treatment.

Specific Treatment.—Codd in 1917 pointed out the value of adrenalin in the disease; in 1924 Chopra and myself showed that adrenalin blocks the action of these bases and recently we have found that pituitrin helps the action of adrenalin. We have been giving $m \cdot ii$ of a 1 in 1000 solution of adrenalin hydrochloride intramuscularly every day for 4 or 5 days, then followed by suprarenalin gr. i. and ext. thyroideum siccum grs. $\frac{1}{2}$ twice a day on an empty stomach for 3 weeks. This treatment usually enables the patient to return with safety to the particular food to which he was sensitive to before treatment. If there is general sensitiveness, it is as well to examine the stools for *E. histolytica* cysts and to examine the size of the liver. Often emetine will cure the amœbic infection of the gut, and at the same time prevent the giant urticaria.

Bowels.—The stools should always be examined by microscopical and bacteriological methods. Salines and intestinal antiseptics like yatren may be necessary if the flora appears abnormal by the presence of yeasts, late lactose-fermentors and streptococcal colonies.

Local treatment by heat should be avoided, as it only increases the œdema; cold evaporating lotions like lotio calamine or lead lotion give the most relief.

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OBSERVATIONS ON THE ANTI-DIABETIC PROPERTIES OF *CEPHALANDRA INDICA* (TELAKUCHA).

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[Indigenous Drugs Series, No. 5 (1).]

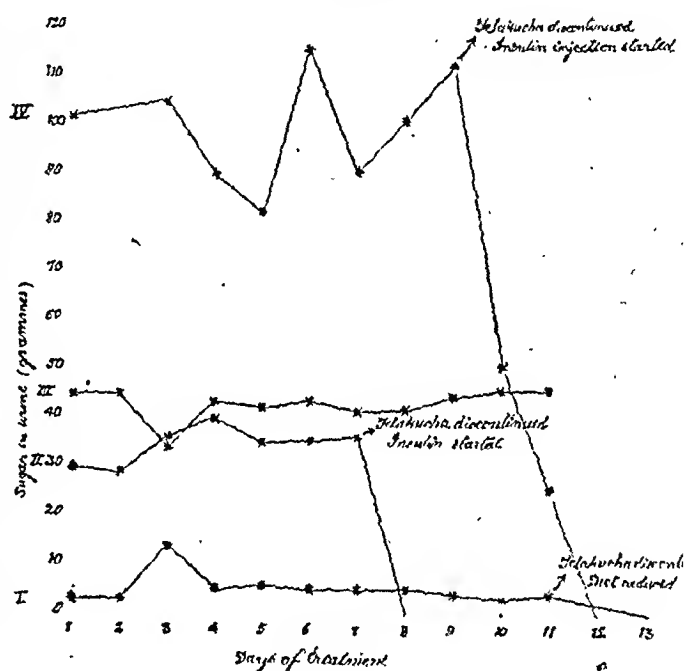
Telakucha (*Cephalandra indica*) is a perennial creeping herb belonging to the natural order Cucurbitaceæ. It grows abundantly throughout India in a wild state and is known as *bimba* or *vimba* in Sanskrit, *kunderi-ki-bel* in Hindi, *tela-kucha* in Bengali, and *kabare-hindi* in Persian. The plant has tuberous roots, deep green leaves and a scarlet coloured fruit with a bitter taste. The Ayurvedic writers recommend the juice of its tuberous roots and leaves in diabetes; the leaves are also used by them in skin diseases. We investigated the anti-diabetic properties of this plant as its juice is often prescribed by medical practitioners in Bengal and wonderful results are ascribed to it.

Chemical Composition and Pharmacological Action.—The plant was analysed for us by Dr. Sudhamoy Ghosh, D.Sc., and Mr. Nihar Ranjan Chatterjee, M.Sc., to both of whom we are very grateful. The details of this work will be published in the *Indian Journal of Medical Research* for July 1925. Besides alkaloids, glucosides, etc., which commonly occur in plants, they also looked for bodies of the nature of hormones. Collip and his co-worker (1923) isolated from yeast, lettuce, onion tops and other plants, a substance called glucokinase which plays an important part in the plant sugar metabolism. Injection of this substance into rabbits causes a fall in the blood-sugar and produces convulsions in exactly the same way as does insulin, and these convulsions can be relieved by administration of glucose. Following a modification of the technique described by Collip, we isolated from this plant a body of the nature of an enzyme, a body of the nature of a hormone, and small traces of an alkaloid. The enzyme showed marked amylolytic properties, but subcutaneous injections in rabbits of these active principles showed no reduction whatsoever in the blood-sugar. The alkaloid was also found to be pharmacologically inert as regards its action on the circulation, respiration and alimentary system.

Clinical Tests.—We tried the fresh juice extracted from the plant in a series of six cases of diabetes in the Carmichael Hospital for Tropical Diseases, to see whether the claims made

regarding its anti-diabetic properties could be substantiated. The patients were selected at random and their carbohydrate intake was fixed and kept strictly under control. The total quantity of urine was collected and examined for the quantity of sugar excreted. The blood-sugar was examined and the patients were regularly weighed. After putting the patient on a strict diet, some time was allowed for the daily output of sugar to attain a constant level. Fresh *tela-kucha* juice was then given in doses of 1 to 2 ounces every morning on an empty stomach. The percentage of sugar in the urine, total sugar excretion, sugar value of the diet and blood-sugar were carefully investigated and recorded in each case.

Graph I.



In Graph I we have recorded the total excretion of sugar in 24 hours' urine of four patients under *tela-kucha*. It will be observed that the sugar excretion in all these cases practically showed no reduction. In cases Nos. II and IV, injection of insulin, just after *tela-kucha* was discontinued, resulted in the rapid fall of both blood and urinary sugar. It is a point worthy of note that case No. I whose average daily excretion of sugar was not more than 7 to 8 grammes only, remained quite unaffected by *tela-kucha*. As soon as the diet was reduced by 10 grammes the sugar entirely disappeared from the urine. Cases Nos. V and VI—not shown on the graph—were under *tela-kucha* treatment for 6 and 8 days, respectively, but showed no diminution in the sugar excretion whatsoever.

The good results claimed from the use of *tela-kucha* plant in cases of diabetes by other observers may be attributed in our opinion to the fact that a fairly large number of cases of so-called diabetes in this country are really cases of intermittent glycosuria, and these cases sometimes

improve without any medical interference. Very slight alterations in diet, as in case No. I, may cause disappearance of sugar from urine. In order to test the anti-diabetic properties of a drug the first thing to determine is the severity of the disease in a patient on whom it is going to be tried by glucose tolerance tests. The carbohydrate tolerance can thus be accurately estimated and then systematic and prolonged observations are made on the sugar in the blood and urine while the drug is being administered.

CONCLUSIONS.

1. The fresh juice extracted from *Cephalandra indica* (*telakucha*) has no sugar reducing effects when administered to patients suffering from diabetes.

2. The active principles of the plant, an amylolytic enzyme, a hormone, and a body of alkaloidal nature do not produce any reduction of blood-sugar when administered subcutaneously to rabbits.

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RECENT ADVANCES IN THE OPERATIVE TREATMENT OF INTESTINAL STASIS.

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As one who has been privileged to assist Sir Arbuthnot Lane at many of his operations for the relief of intestinal stasis during the past year, I am writing this brief note on the latest development of his surgical practice.

At the risk of repeating what I have no doubt is very well known to many of my readers, I must begin by a recapitulation of the pathology on which the treatment is based.

Owing to the rush and hurry of modern life, to the inhibitions imposed by civilisation, more and more people are yearly becoming the victims of chronic constipation. Probably one of the most powerful of the influences which brings this about, is the deliberate disregard of the calls of Nature and the systematic inhibition of the activity of the reflex mechanism of the lower bowel to suit the exigencies of school life.

The effluent of the small intestine is liquid on its entry into the cæcum, and the fæces of a physiologically efficient human being would be liquid or semi-liquid, as indeed they are with primitive or uncivilized peoples.

Rendle Short(1) quotes an interesting case in which the cæcum had prolapsed after an operation for appendicostomy in a case of chronic dysentery and everted itself through the wound so that the movements of the ileo-cæcal valve were plainly visible on the surface of the abdomen. It was noticed that directly after the

entry of food into the stomach the valve opened and the contents of the ileum were released into the cæcum in a series of jets and squirts by the peristalsis of the small bowel. The sphincter lay quite patulous for as long as half an hour after the end of the meal. It would appear to be a reasonable inference to assume that three liquid stools a day would be natural in those who eat three meals a day.

It is, however, a well ascertained fact in physiology that the rectum possesses great powers of absorbing water from the fæces, and that the longer the fæces are left in the large bowel the less water is left in them, until they may assume a stony hardness. It is obviously more difficult for the bowel to propel a solid cast of itself through its kinks and curves than it would be to release a liquid effluent. One of the first effects of this chronic over-loading of the bowel is experienced in that portion of the large intestine which is called the pelvic colon, and in consequence of the constant strain to which the suspensory mesentery of this loop of gut is subjected, bands of thickened tissue are developed along the outer leaf of the meso-sigmoid.

At first salutary in its effect, owing to the inevitable tendency of this tissue to contract, the mesentery of the sigmoid becomes shortened and deformed and the gut sharply kinked as a result of the opposition of the pull of the ligament to the unrelenting drag of gravitation. The last condition of the bowel is, therefore, worse than the first, and the attempts by Nature to remedy the morbid condition have ended by aggravating it. It is to this acquired band or rather to the result of its development that Sir Arbuthnot Lane, who was the first to point out its existence, gave the name of the "first and last kink." First, because it was the first in point of time to develop, and last because it is the kink situated on the lowest part of the large bowel.

It is in the direction of freeing this "first and last kink" that the latest development in the operative treatment of intestinal stasis has taken place. Sir Arbuthnot Lane regards this kink as the commencement of all the subsequent troubles which arise in an orderly sequence along the whole course of the alimentary tract. He calls it "a veritable Pandora's box which spells the failure of modern civilization."

The other main kinks which arise in the following sequence are:—at the splenic flexure; at the hepatic flexure; at the outer side of the cæcum and ascending colon; at the last few inches of the ileum, this kink may be brought about either by a "controlling appendix" or by a "Lane's band"; and finally at the duodeno-jejunal flexure and the gastro-hepatic omentum.

The effect of this first and last kink is to produce a condition of delay in the large intestine, and the longer this persists the further up the gut creep the effects of this rising tide of stasis. With the development of the ileal band (Lane's kink) or with the appearance of a

controlling appendix commences the water-logging of the small gut, consequent on the damming up of the ileal effluent and the consequent imposition of strain on the most vulnerable part of this sector of the gut, the gastro-duodenal flexure. A further block is thus established at this point, leading to choking of the duodenum and subsequently to the development of ulceration in the duodenum and stomach. A partial recognition of these facts by workers other than Sir Arbuthnot Lane confirms the frequent association of such conditions as duodenal ulcer and appendicitis. Sherren(2) found the appendix normal in 4 only out of 65 cases of duodenal ulcer, and in 5 only out of 41 cases of gastric ulcer.

It was left for Sir Arbuthnot Lane to evolve the comprehensive and logical formula which explains the problems presented by the protean complex which is gradually becoming recognised by medical men under the title of "intestinal stasis." Briefly, the series of changes which are initiated in the entire gastro-intestinal tract are as inevitable, and show as orderly a progression as those leading to the destruction of the secreting tissues of a floating kidney, in which the degree of motility is sufficient to allow kinking of the ureter and consequent damming back of urine and back pressure on the secreting tubules and the glomeruli.

Why people who are willing to admit that kinking of the ureter may produce back pressure on the kidney and subsequent damage to that organ, will deny with passionate energy that the most extreme degree of kinking of the bowel can in any way impede the passage of its effluent through it, I have never been able to understand. It is equally incomprehensible why those who will freely admit the presence of a mechanism in the body by which tissues and organs are able to adapt themselves to the effects of strain, will vehemently repudiate the possibility of a chronically overloaded mesentery crystallising its resistance to strain in the shape of adventitious bands of connective tissue along the lines through which that strain is constantly acting. Since in this stage of the controversy few will be found to deny the existence of the bands and kinks to which attention has been drawn by their discoverer, the opposition now attributes them to developmental defect. Even were they of developmental origin, a statement in support of which no one has ever advanced any proof, the medical attendant would still be faced with the necessity of treating them and the morbid states to which they give rise.

Lane's operation for the first and last kink.—Though the operation of colectomy is still performed by its inventor in certain cases, such as for cancer of the large intestine or extreme lengthening of the pelvic colon, he is not performing this operation as frequently as he used to do when on the staff of Guy's Hospital, as in private practice he does not see the end-results of intesti-

nal stasis in the extreme degree that was common in hospital practice.

In a very large proportion of cases excellent results are obtained by freeing the first and last kink alone, as this may be the principal cause of stasis. At the same time a systematic search is made through the entire alimentary tract for any other bands or adhesions which may be present. It is not uncommon to find a controlling appendix acting as a sling to the terminal inch or two of the ileum and thus controlling the ileal effluent.

I suppose every surgeon in reviewing his experience can recall cases in which the removal of an anchored appendix has turned a thin, anxious-looking, miserable, dyspeptic man or woman into a prosperous and happy being, radiating eupeptic jollity. The recollection of these cases does something to offset the memory of perhaps as many cases in which the same operation entirely failed to relieve the symptoms which drove the patient to seek surgical aid, and in which the co-existence of a first and last kink would render the effects of such an operation almost nugatory.

Operation, Incision.—In the middle line, from umbilicus to pubes. The so-called cosmetic or para-rectus scar incision is unsatisfactory as it affords only partial access to the abdomen at large and there is a risk of damaging the nerve supply of the rectus muscle. Someone recently observed that the day had gone by when the surgeon conducted his examination with two fingers in the abdomen and his eyes fixed on the ceiling.

Instruments.—The special cleft palate needle holder designed by Sir Arbuthnot Lane, and the concave retractor which was invented by him for this operation are extremely useful in dealing with adhesions in a deep pelvis.

After a general survey of the bowel, the loop of pelvic colon is drawn up and any adhesions or bands divided, the resulting raw surface being carefully "peritonised" to prevent the subsequent formation of adhesions.

The last few inches of the ileum are then examined and any band divided or a "controlling appendix," if present, removed.

The splenic and hepatic flexures are next examined and if necessary freed; in short after a general survey of the bowel any morbid condition met with is rectified.

The division of bands in the right iliac fossa is not entirely free from risk: living pathogenic organisms having been demonstrated in these acquired bands, hence in cases where the division of a Lane's band is necessary it is advisable to leave a small drain in for 24 hours.

To use a cant phrase, the results of this operation must be seen to be believed, and to deal exhaustively with its benefits would be to transgress the space at my disposal.

Two conditions, however, are so strikingly ameliorated as a result that they deserve a moment's attention: I refer to epilepsy and

sexual incompetence. With regard to the first I cannot do better than refer my reader to the article by White Robertson in the *British Medical Journal* for the 27th December, 1924, on "Chronic Intestinal Stasis and Epilepsy." (3)

Sir Arbuthnot Lane has so frequently drawn attention to the restoration of sexual powers as a result of freeing the ileal effluent that the only comment necessary in this connection is to remark that the division of the first and last kink may be and is in many cases as effective as the more serious operative procedures formerly practised.

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THE VALUE OF THE ALDEHYDE TEST IN THE DIAGNOSIS OF KALA-AZAR.

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(Being a paper read at the Medical Research
Section of the Indian Science Congress,
January, 1925.)

SINCE the accidental discovery of jellification of syphilitic serum on the addition of formalin by Gates and Pappacosta, the "formol-gel" test has been tried in many other diseases. The most important practical result was Napier's discovery that a remarkable change occurs in the serum of kala-azar patients, if a drop of commercial formalin is added to it. The serum becomes opaque and jellified. According to Napier's classification a serum giving a +++ aldehyde reaction turns at once like the white of a boiled egg. It was found, however, that unless a patient gave a definite and clear history of illness for four or five months, this "aldehyde" test was either negative or doubtful.

Since the discovery of this test, various workers have challenged its value, the most remarkable contribution being that from Colonel Elwes and Drs. Menon and Ramakrishnan. They showed that in 4 out of 49 cases liver puncture did not show Leishman-Donovan bodies although the aldehyde test was + + +. Again, in no less than 13 cases of clinical kala-azar, Leishman-Donovan bodies were found by liver puncture, although the aldehyde test was negative. It is a pity, however, that they did not mention the probable duration of the disease, for Napier reported in 1923 that the duration of the disease was an important factor in interpreting the results of this test. In the first few months of the disease, Leishman-Donovan bodies may be found in enormous numbers from spleen or liver puncture, although the aldehyde test is negative.

During my investigation on this subject, I have found that in various diseases other than kala-

azar the blood serum may be changed in such a way that the aldehyde test is positive, but it was never + + + as in advanced cases of kala-azar, except in one solitary case of spleno-medullary leukaemia, reported by me in February 1924. In no other cases of this disease was the test positive. It is probable that this case was one of double infection, but the diagnosis could not be definitely made, as spleen puncture is contraindicated in this disease and the patient refused to stay in the hospital for a sufficiently long time for observation.

Nowadays with improved methods of diagnosis, patients are rarely seen with an aldehyde test + + +; hence it is increasingly important to know whether a + + or a + aldehyde reaction is absolutely diagnostic of kala-azar. During my investigations in 1924 I have found positive reactions in some other conditions.

It was positive in five patients with chronic skin diseases suffering from mixed staphylococci and streptococci dermatitis. It was negative in 8 cases of the same nature.

It was positive in 8 cases of convalescent pneumonia. The blood serum was examined within one to three days after crisis occurred. Two cases, however, showed negative results.

It was positive in three chronic malarial cases. The spleen puncture showed no Leishman-Donovan bodies and the patients were cured by cinchona febrifuge. On the other hand, 38 cases of chronic malaria showed negative results.

So it will be seen that the mere presence of + + or + aldehyde reaction is not absolutely diagnostic of kala-azar. It should be noted that the positive phase of Napier's aldehyde test and of Brahmachari's globulin test depends on the increase in the globulin of the serum in kala-azar patients. At the Science Congress held in Madras in 1921, I observed that the turbidity of Ray's hæmolytic test, so much enlogised by H. Wu of the Peking Union Medical College, was due to precipitation of the excess of globulin present in the serum of kala-azar patients, and not to the presence of resistant erythrocytes and shadow corpuscles as thought by Dr. Ray. In September 1923, I reported that the euglobulin factor was much more increased than the paraglobulin factor, as shown by ammonium sulphate tests; and that jellification was not always dependent on the amount of globulin, although usually the time of jellification was inversely proportional to the amount of globulin present. That this phase of jellification is not always associated with increase in the globulin content is proved in some chronic malaria cases, where although we get profuse precipitation on the addition of aldehydes, we get no jellification at all.

Further investigation on this matter showed that addition of distilled water to the serum precipitated the euglobulin, the colloids of which were charged with negative electricity, as proved by the method of *capillary analysis* by dipping a

piece of blotting paper into a mixture of distilled water and serum and noting that the fluid rises uniformly on the strip of paper. I repeated the experiments with one-third saturated solution of ammonium sulphate, half-saturated solution of magnesium sulphate and 14 per cent. solution of sodium sulphate; the results were the same in all the cases.

The next investigation was directed towards finding the electric charges of the paraglobulin colloids, which were obtained after dialysing the euglobulin and treating the filtrate with saturated solution of magnesium sulphate and dipping strips of filter paper into it. The rise of fluid in the paper was again uniform, showing that the colloids of paraglobulin are also charged with negative electricity.

It may be deduced from these experiments that addition of formalin introduces positive ions into the serum by dissociation of the electrolytes present in the serum. There must be some variation in the electrolytic conditions present in the serum which causes the formation of more suspensoids than emulsoids in the mixture in the majority of cases of chronic malaria. I have commenced investigations into the changes—if any—of the saline constituents of the serum which may have an influence on the osmotic pressure of the dispersion medium, so that precipitation occurs without jellification in the serum of some chronic malaria and other cases, when formalin is added to it.

The results of my investigation on the contents of the blood are tabulated as follows. Ray's method, with certain modifications, was adopted. The results are given in grammes of nitrogen per 100 c.c. of the serum:—

TABLE I.

Advanced Kala-azar cases of over five months' duration.

| | Euglobulin. | Paraglobulin. |
|------------|-------------|---------------|
| No. 1 .. | 0.304 | 0.4 |
| No. 2 .. | 0.36 | 0.23 |
| No. 3 .. | 0.52 | 0.36 |
| No. 4 .. | 0.46 | 0.30 |
| Average .. | 0.411 | 0.32 |

TABLE II.

Normal healthy individuals.

| | Euglobulin. | Paraglobulin. |
|------------|-------------|---------------|
| No. 1 .. | 0.026 | 0.36 |
| No. 2 .. | 0.032 | 0.42 |
| No. 3 .. | 0.030 | 0.24 |
| No. 4 .. | 0.036 | 0.22 |
| Average .. | 0.031 | 0.31 |

TABLE III.

Early cases of Kala-azar of less than four months' duration.

| | Euglobulin. | Paraglobulin. |
|-----------------------------------|-------------|---------------|
| No. 1 (less than one month) .. | 0.06 | 0.28 |
| No. 2 (less than two months) .. | 0.09 | 0.41 |
| No. 3 (between 2 and 3 months) .. | 0.13 | 0.32 |
| No. 4 (between 3 and 4 months) .. | 0.20 | 0.36 |

TABLE IV.

Chronic Malaria cases with a Positive Aldehyde Test.

| | Euglobulin. | Paraglobulin. |
|------------|-------------|---------------|
| No. 1 .. | 0.20 | 0.40 |
| No. 2 .. | 0.168 | 0.32 |
| Average .. | 0.184 | 0.36 |

TABLE V.

Chronic Malaria cases with a Negative Aldehyde Test.

| | Euglobulin. | Paraglobulin. |
|------------|-------------|---------------|
| No. 1 .. | 0.12 | 0.20 |
| No. 2 .. | 0.136 | 0.32 |
| Average .. | 0.128 | 0.26 |

It will be seen from these tables that in normal human beings the average nitrogen value of euglobulin in grammes per 100 c.c. of the serum is 0.031, whereas it is 0.411 in advanced kala-azar patients, i.e., more than 13 times that of the normal serum. In early cases of kala-azar, the nitrogen value of the euglobulin is gradually increased according to the duration of the disease. In 2 cases of chronic malaria, though the euglobulin factor was increased, yet its nitrogen value did not approach that in kala-azar of advanced type, even after two years of suffering. It will be seen that the increase of the euglobulin factor in kala-azar is a very gradual procedure and is associated directly with the duration of the disease.

It is known that antibodies reside in the euglobulin factor of the serum, and the suggestion that in kala-azar the gradual accumulation of antibodies leads to the increase in the euglobulin seems to be very plausible. Attempts have been made to prove the existence of complement-fixing antibodies and other antibodies in kala-azar sera, but no satisfactory conclusions have yet been arrived at. But it appears that in all cases—except in convalescent pneumonia—where the aldehyde test has been positive, the diseases are of a chronic nature and lead to a gradual accumulation of antibodies. Syphilis, chronic malaria and chronic skin diseases are instances of this kind, where the formation of antibodies is a slow procedure. In convalescent pneumonia the formation of antibodies is very rapid, as is shown by crisis within seven days. Again, even after kala-azar is practically cured, the elimination of antibodies takes some time, with the result that the aldehyde test remains still positive for one or two months after Leishman-Donovan bodies disappear from the spleen or liver. The disappearance of a positive reaction is again a gradual procedure and takes place as slowly or as quickly as was the case with its appearance. There is, however, one difference. In the beginning of the disease the jellification is more marked than the opacity, and it is only by passing through the mixture a beam of sunlight, which is known as the *Tyndall phenomenon*, that the precipitates are demonstrable in early cases; whereas the disappearance of the aldehyde reaction after cure is heralded by lengthening of the time and final disappearance of jellification, long before the excess of precipitation has vanished.

The value of the aldehyde test is thus a purely negative one. There was not a single case of

kala-azar with a clear history of more than five months' duration in which spleen puncture showed Leishman-Donovan bodies, where the aldehyde test was negative. Eight suspected cases with clinical symptoms of kala-azar and a kala-azar blood picture were thus investigated. The thirteen cases mentioned by Colonel Elwes were probably early cases of kala-azar, where, although Leishman-Donovan bodies were numerous in smears from liver punctures, the euglobulin factor was not sufficiently developed to give a positive aldehyde test. But in all cases of suspected kala-azar with a clear history of duration of five months or over, a negative reaction is definite evidence that they are not suffering from kala-azar.

OBSERVATIONS ON THE TREATMENT OF KALA-AZAR WITH UREA STIBAMINE IN THE MEDICAL OUT-PATIENT DEPARTMENT OF THE MEDICAL COLLEGE HOSPITAL, CALCUTTA.

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THE prolonged course of treatment required to bring about sterilization with tartar emetic or

sodium antimonyl tartrate in cases of kala-azar, and the fact that in a definite percentage of cases the disease is resistant to these salts led me to give a trial to urea stibamine, which had given such remarkably beneficial results in the hands of many previous workers. The cases treated were a series of unselected cases from the out-patient department of the Calcutta Medical College Hospital.

The present paper gives in tabular form the results of treatment with urea stibamine of the first fifty cases. Table A gives a series of cases treated with urea stibamine from the very beginning, and Table B consists of cases resistant to antimonyl tartrates and subsequently cured with urea stibamine.

The cultures of the venous blood were carried out in the kala-azar research laboratory, under the direct supervision of Dr. U. N. Brahmachari. The technique was carried out by his assistant, Dr. B. Maity, and he states that it consists in culturing citrated peripheral blood on N.N.N. medium at an average temperature of 25°C. The time of observation before treatment was begun was from 6 to 10 days, and after treatment from 2 to 3 weeks. It is the usual custom to send kala-azar patients from the out-patient department of the Medical College Hospitals' group to this laboratory for blood culture.

TABLE A.

| Serial No. | Age, Sex, Caste. | Duration of illness before treatment. | Temperature before treatment. | BEFORE TREATMENT. | | | | | Total No. of injections. | Total amount given. | No. of injections. | Total amount after which blood culture was negative. | Period of observation in days after completion of treatment. | REMARKS. |
|------------|------------------|---------------------------------------|-------------------------------|---|----------------|------------------------|----------------|------------|--------------------------|---------------------|--------------------|--|--|--|
| | | | | AFTER PERIOD OF OBSERVATION ON COMPLETION OF TREATMENT. | | | | | | | | | | |
| | | | | Size of spleen. | Blood culture. | BLOOD COUNT | | | | | | | | |
| R. B. C. | W. B. C. | Hb. | | | | | | | | | | | | |
| 1 | 30 H. M. | 6 m. | Irregular. | 5" Nil. | P. N. | 2,700,000 3,800,000 | 3,000 5,000 | 28% 55% | 10 | 1.6 gm. | 6 | 0.8 gm. | 36 | Cured. Blood culture negative after 9 days' treatment. |
| 2 | 15 H. M. | 2 m. | 98° 104° | 3" Nil. | P. N. | 3,200,000 3,700,000 | 2,500 5,000 | 40% 65% | 8 | 0.8 gm. | 8 | 0.8 gm. | 18 | Cured. Blood culture negative after 12 days' treatment. |
| 3 | 12 H. M. | 3 m. | 99° 102° | 3" Nil. | P. N. | 2,900,000 3,600,000 | 2,800 6,200 | 35% 58% | 8 | 1.4 gm. | 5 | 0.8 gm. | 32 | Cured. Blood culture negative after 7 days' treatment. |
| 4 | 18 H. M. | 8 m. | 101° 103° | 6" Nil. | P. N. | 2,600,000 3,200,000 | 1,800 6,200 | 32% 58% | 16 | 2.4 gm. | 10 | 1 gm. | 36 | Cured. |
| 5 | 12 H. M. | 6 m. | 99° 101° | 5" Nil. | P. N. | 2,400,000 3,900,000 | 2,800 5,200 | 40% 60% | 13 | 2.2 gm. | 8 | 1.2 gm. | 28 | Cured. Temperature normal after second injection. |
| 6 | 16 H. M. | 6 m. | 99° 102° | 5½" Nil. | P. N. | 2,400,000 3,600,000 | 2,800 6,000 | 40% 60% | 9 | 0.9 gm. | 6 | 0.6 gm. | 65 | Cured. Blood culture negative after 11 days' treatment. |
| 7 | 8 M. Ch. | 12 m. | 98° 101° | 6" 2" | P. N. | 2,000,000 3,200,000 | 2,200 6,800 | 45% 65% | 12 | 1.2 gm. | 8 | 0.8 gm. | 25 | Cured. Temperature became normal after second injection. |
| 8 | 10 M. Ch. | 5 m. | 99° 101° | 5" Pal. | P. N. | 3,000,000 3,800,000 | 3,200 5,000 | 48% 52% | 15 | 2.4 gm. | 13 | 2.0 gm. | 34 | Cured. |
| 9 | 35 M. M. | 12 m. | 98° 100° | 4" Nil. | P. N. | 3,000,000 3,800,000 | 3,700 7,200 | 40% 60% | 13 | 1.3 gm. | 9 | 0.9 gm. | 25 | Do. |
| 10 | 386 M. M. | 5 m. | 99° 103° | 7" Nil. | P. N. | 2,000,000 4,000,000 | 2,500 9,000 | 55% 80% | 12 | 2.4 gm. | 8 | 1.5 gm. | 90 | Cured. Blood culture negative after 13 days' treatment. |

TABLE A.—Contd.

TABLE A.—Contd.

| Serial No. | Age, Sex, Case. | Duration of illness before treatment. | Temperature before treatment. | BEFORE TREATMENT. | | | | | Total No. of injections. | Total amount given. | No. of injections. | Total amount after which blood culture was negative. | Period of observation in days after completion of treatment. | REMARKS. |
|------------|-----------------|---------------------------------------|-------------------------------|---|----------------|------------------------|----------------|------------|--------------------------|---------------------|--------------------|--|--|---|
| | | | | AFTER PERIOD OF OBSERVATION ON COMPLETION OF TREATMENT. | | | | | | | | | | |
| | | | | Size of spleen. | Blood culture. | BLOOD COUNT. | | | | | | | | |
| | | | | | | R. B. C. | W. B. C. | Hb. | | | | | | |
| 11 | 9 H. M. | 6 m. | 99° 102° | 2½" Nil. | P. N. | 3,400,000 5,000,000 | 4,200 7,500 | 55% 70% | 4 | 0·25 gm. | 3 | 0·15 gm. | 150 | Cured. Blood culture negative after 7 days' treatment. |
| 12 | 20 H. M. | 9 m. | 99° 100·4° | 5" Nil. | P. N. | 2,700,000 3,400,000 | 2,800 5,600 | 40% 54% | 8 | 1·2 gm. | 6 | 0·8 gm. | 34 | Cured. Blood culture negative after 11 days' treatment. |
| 13 | 14 H. M. | 12 m. | 99° 101° | 6" Nil. | P. N. | 2,800,000 4,000,000 | 2,800 6,000 | 52% 65% | 12 | 1·6 gm. | 9 | 1·1 gm. | 22 | Cured. |
| 14 | 10 M. M. | 3 m. | 101° 101° 103° | 4" Nil. | P. N. | 3,000,000 4,200,000 | 3,200 6,200 | 50% 65% | 6 | 0·6 gm. | 4 | 0·4 gm. | 45 | Cured. Blood culture negative after 14 days' treatment. |
| 15 | 20 H. M. | 4 yrs. | 99° 101° | 5" Nil. | P. N. | 2,800,000 4,200,000 | 2,100 7,000 | 36% 70% | 15 | 1·5 gm. | 12 | 1·2 gm. | 60 | Cured. |
| 16 | 17 H. M. | 6 m. | 99° 100° | 6" 1½" | P. N. | 3,200,000 4,700,000 | 3,400 7,700 | 48% 70% | 14 | 2·4 gm. | 10 | 1·6 gm. | 36 | Do. |
| 17 | 25 H. M. | 5 m. | 99° 103° | 4" Nil. | P. N. | 2,900,000 4,800,000 | 2,800 7,800 | 32% 60% | 8 | 0·8 gm. | 5 | 0·5 gm. | 90 | Cured. Blood culture negative after 16 days' treatment. |
| 18 | 12 H. M. | 10 m. | 99° 101° | 4" Nil. | P. N. | 3,400,000 4,100,000 | 3,000 7,500 | 50% 70% | 7 | 0·7 gm. | 6 | 0·6 gm. | 26 | Cured. Blood culture negative after 11 days' treatment. |
| 19 | 20 H. M. | 6 m. | 99° 100° | 6" Nil. | P. N. | 2,800,000 4,700,000 | 2,800 6,000 | 42% 70% | 14 | 2·8 gm. | 12 | 1·0 gm. | 25 | Cured. |
| 20 | 20 H. M. | 4 m. | 99° 101° | 4" Nil. | P. N. | 2,200,000 3,600,000 | 2,187 6,200 | 48% 60% | 10 | 1·4 gm. | 8 | 0·8 gm. | 42 | Cured. Blood culture negative after 15 days' treatment. |
| 21 | 30 H. M. | 9 m. | 101° 103° | 5" Nil. | P. N. | 3,600,000 4,200,000 | 4,000 5,800 | 48% 68% | 10 | 0·8 gm. | 10 | 0·8 gm. | 32 | Cured. |
| 22 | 26 H. M. | 11 m. | 99° 102° | 6" Nil. | P. N. | 2,700,000 4,100,000 | 2,600 9,200 | 32% 75% | 8 | 1·2 gm. | 6 | 0·8 gm. | 68 | Cured. Blood culture negative after 9 days' treatment. |
| 23 | 32 H. M. | 14 m. | 98° 101° | 6" 1" | P. N. | 3,200,000 3,400,000 | 3,100 5,000 | 50% 55% | 10 | 1·6 gm. | 8 | 1·2 gm. | 45 | Cured. Blood culture negative after 13 days' treatment. |
| 24 | 16 H. M. | 6 m. | 99° 101° | 5" Nil. | P. N. | 2,600,000 4,100,000 | 2,800 7,000 | 40% 75% | 12 | 2·0 gm. | 10 | 1·6 gm. | 18 | Cured. |
| 25 | 20 H. M. | 5 m. | 100° | 4" Nil. | P. N. | 3,400,000 4,000,000 | 3,700 8,200 | 50% 70% | 9 | 1·6 gm. | 5 | 0·8 gm. | 29 | Cured. Blood culture negative after 7 days' treatment. |

TABLE B.

| Serial No. | Age, Sex, Caste. | Duration of treatment with Antimonyl Tartrates. | Temperature before treatment with Urea Stibamine. | BEFORE TREATMENT. | | | | | Total No. of injections. | Total amount given. | No. of injections. | Total amount after which blood culture was negative. | Period of observation in days after completion of treatment. | Result of treatment. | Previous treatment and interval between this and treatment with Urea Stibamine. |
|------------|------------------|---|---|---|----------------|------------------------|----------------|------------|--------------------------|---------------------|--------------------|--|--|----------------------|--|
| | | | | AFTER PERIOD OF OBSERVATION ON COMPLETION OF TREATMENT. | | | | | | | | | | | |
| | | | | Size of spleen. | Blood culture. | BLOOD COUNT. | | | | | | | | | |
| | | | | | | R. B. C. | W.B.C. | Hb. | | | | | | | |
| 1 | 11 E. M. | ? | 99° 100° | 4" Nil. | P. N. | 3,000,000 3,600,000 | 3,400 6,800 | 48% 60% | 8 | 1·4 gm. | 6 | 1·0 gm. | 90 | C | Had 2·4 gm. of Sod. Ant. Tart. in 26 injens. without benefit. Interval—one month. Blood culture negative after 20 days' treatment. |

TABLE B.—Contd.

| Serial No. | Age, Sex, Caste. | Duration of treatment with Antimonyl Tartrates. | Temperature before treatment with Urea Stibamine. | BEFORE TREATMENT. | | | | | Total No. of injections. | Total amount given. | No. of injections. | Total amount after which blood culture was negative. | Period of observation in days after completion of treatment. | Result of treatment. | Previous treatment and interval between this and treatment with Urea Stibamine. |
|------------|------------------|---|---|---|----------------|------------------------|----------------|------------|--------------------------|---------------------|--------------------|--|--|----------------------|--|
| | | | | AFTER PERIOD OF OBSERVATION ON COMPLETION OF TREATMENT. | | | | | | | | | | | |
| | | | | Size of spleen. | Blood culture. | BLOOD COUNT. | | | | | | | | | |
| R. B. C. | W.B.C. | Hb. | | | | | | | | | | | | | |
| 2 | 23 H. M. | 9 m. | 99° | 6" Nil. | P. N. | 2,800,000 4,200,000 | 2,800 6,800 | 50% 80% | 15 | 2.5 gm. | 12 | 2.0 gm. | 120 | C | Had 5.6 gm. of Sod. Ant. Tart. in 66 injens. without benefit. Interval—4 months. Blood culture negative after 45 days. |
| 3 | 12 H. M. | 6 m. | 100° | 5" Nil. | P. N. | 2,500,000 4,400,000 | 3,200 5,600 | 32% 60% | 14 | 2.4 gm. | 10 | 1.6 gm. | 150 | C | Had 2.6 gm. of Sod. Ant. Tart. in 45 injens. without benefit. Interval—2½ months. Blood culture negative after 32 days. |
| 4 | 24 H. M. | 7 m. | 100° 102° | 6" Nil. | P. N. | 1,800,000 3,200,000 | 1,000 5,600 | 28% 70% | 15 | 2.5 gm. | 12 | 1.5 gm. | 165 | C | Had 2.8 gm. of Sod. Ant. Tart. in 30 injens. and 1.8 gm. of Pot. Ant. Tart. in 25 injens. without benefit. Interval—3 months. Blood culture negative after 21 days' treatment. |
| 5 | 28 H. M. | 8 m. | 100° | 5" Nil. | P. N. | 3,300,000 4,100,000 | 2,500 6,200 | 52% 70% | 13 | 2.3 gm. | 8 | 1.0 gm. | 60 | C | Had 3.2 gm. of Sod. Ant. Tart. in 52 injens. without benefit. Interval—2½ months. Blood culture negative after 28 days' treatment. |
| 6 | 28 H. M. | 6 m. | 99° 101° | 5" Nil. | P. N. | 3,400,000 3,800,000 | 4,200 5,500 | 50% 70% | 14 | 2.6 gm. | 10 | 1.8 gm. | 120 | C | Had 2.5 gm. of Sod. Ant. Tart. in 45 injens. without benefit. Interval—4 months. Blood culture negative after 32 days' treatment. |
| 7 | 20 H. M. | 1 year and 2 m. | 98° 100° | 6" Nil. | P. N. | 2,300,000 3,600,000 | 3,000 6,000 | 48% 70% | 15 | 2.6 gm. | 12 | 2.0 gm. | 165 | C | Had 5.2 gm. of Sod. Ant. Tart. in 60 injens. and 2 gm. of Pot. Ant. Tart. in 30 injens. without benefit. Interval—6 months. Blood culture negative after 44 days' treatment. |
| 8 | 8 M. Ch. | 9 m. | 99° | 6" Nil. | P. N. | 3,000,000 4,700,000 | 4,500 8,700 | 58% 72% | 13 | 2.0 gm. | 6 | 1.0 gm. | 60 | C | Had 3 gm. of Sod. Ant. Tart. in 65 injens. without benefit. Interval—5 months. Blood culture negative after 22 days' treatment. |
| 9 | 21 H. M. | 4½ m. | 101° | 5" Nil. | P. N. | 4,000,000 4,200,000 | 3,700 5,800 | 55% 70% | 10 | 1.6 gm. | 5 | 0.8 gm. | 30 | C | Had 2.5 gm. of Sod. Ant. Tart. in 32 injens. without benefit. Interval—3 months. Blood culture negative after 18 days' treatment. |
| 10 | 30 H. M. | 7 m. | 99° 100° | 5½" Nil. | P. N. | 2,800,000 .. | 3,000 7,000 | 55% .. | 12 | 2.4 gm. | 7 | 1.4 gm. | 90 | C | Had 3.7 gm. of Sod. Ant. Tart. in 48 injens. without benefit. Interval—4 months. Blood culture negative after 30 days' treatment. |
| 11 | 8 H. M. | 6 m. | 99° | 3" Nil. | P. N. | 3,500,000 5,000,000 | 3,600 6,200 | 55% 75% | 8 | 1.4 gm. | 4 | 0.55 gm. | 60 | C | Had 1.6 gm. of Sod. Ant. Tart. in 42 injens. without benefit. Interval—2½ months. Blood culture negative after 12 days' treatment. |

TABLE B.—Contd.

| TABLE B.—Contd. | | | | | | | | | | | | | | | |
|-----------------|------------------|---|---|---|----------------|------------------------|----------------|------------|--------------------------|---------------------|--------------------|--|--|----------------------|--|
| Serial No. | Age, Sex, Caste. | Duration of treatment with Antimonyl Tartrates. | Temperature before treatment with Urea Stibamine. | BEFORE TREATMENT. | | | | | Total No. of injections. | Total amount given. | No. of injections. | Total amount after which blood culture was negative. | Period of observation in days after completion of treatment. | Result of treatment. | Previous treatment and interval between this and treatment with Urea Stibamine. |
| | | | | AFTER PERIOD OF OBSERVATION ON COMPLETION OF TREATMENT. | | | | | | | | | | | |
| | | | | Size of spleen. | Blood culture. | BLOOD COUNT. | | | | | | | | | |
| R. B. C. | W.B.C. | Hb. | | | | | | | | | | | | | |
| 12 | 30 H. M. | 6 m. | 99 102° | 3" Nil. | P. N. | 4,200,000 4,200,000 | 4,000 6,000 | 65% 65% | 10 | 2.0 gm. | 8 | 1.6 gm. | 75 | C | Had 2 gm. of Sod. Ant. Tart. in 42 injens. without benefit. Interval—1½ months. Blood culture negative after 14 days' treatment. |
| 13 | 11 H. M. | 12 m. | 99° 101° | 4" Nil. | P. N. | 3,600,000 3,900,000 | 3,700 8,200 | 55% 70% | 9 | 1.8 gm. | 4 | 0.8 gm. | 90 | C | Had 3 gm. of Sod. Ant. Tart. in 80 injens. without benefit. Interval—5 months. Blood culture negative after 12 days' treatment. |
| 14 | 18 H. M. | 3 m. | 99° | 4" Nil. | P. N. | 1,800,000 4,400,000 | 1,800 5,200 | 34% 65% | 4 | 0.6 gm. | 3 | 0.4 gm. | 60 | C | Had 1.4 gm. of Sod. Ant. Tart. in 22 injens. without benefit. Interval—4 months. Blood culture negative after 7 days' treatment. |
| 15 | 9 | 5 m. | 99° 101° | 3½" Nil. | P. N. | 2,900,000 4,500,000 | 3,100 7,800 | 50% 75% | 6 | 0.6 gm. | 4 | 0.4 gm. | 90 | C | Had 1.2 gm. of Sod. Ant. Tart. in 30 injens. without benefit. Interval—3 months. Blood culture negative after 12 days' treatment. |
| 16 | 25 H. M. | 9 m. | 99° 101° | 6" Nil. | P. N. | 3,700,000 3,700,000 | 2,700 5,200 | 56% 65% | 14 | 2.4 gm. | 8 | 1.2 gm. | 60 | C | Had 4 gm. of Sod. Ant. Tart. in 62 injens. without benefit. Interval—3½ months. Blood culture negative after 32 days' treatment. |
| 17 | 30 H. M. | 4 m. | 99° 100° | 4" Nil. | P. N. | 3,000,000 4,500,000 | 4,600 5,200 | 50% 70% | 9 | 1.8 gm. | 8 | 1.6 gm. | 45 | C | Had 2.4 gm. of Sod. Ant. Tart. in 30 injens. without benefit. Interval—2 months. Blood culture negative after 14 days' treatment. |
| 18 | 28 H. M. | 6 m. | 99° 100° | 5" Nil. | P. N. | 2,000,000 4,100,000 | 2,800 7,000 | 50% 75% | 12 | 2.4 gm. | 10 | 2.0 gm. | 60 | C | Had 2.8 gm. of Sod. Ant. Tart. in 38 injens. without benefit. Interval—1½ months. Blood culture negative after 10 days' treatment. |
| 19 | 25 H. M. | 9 m. | 100° | 5" Nil. | P. N. | 3,200,000 4,200,000 | 3,000 5,200 | 48% 75% | 8 | 1.6 gm. | 6 | 1.2 gm. | 60 | C | Had 3 gm. of Sod. Ant. Tart. in 50 injens. without benefit. Interval—3 months. Blood culture negative after 10 days' treatment. |
| 20 | 10 H. M. | 4 m. | 100° 102° | 4" Nil. | P. N. | 1,200,000 4,200,000 | 2,600 6,800 | 30% 65% | 10 | 1.0 gm. | 6 | 0.6 gm. | 90 | C | Had 2.8 gm. of Sod. Ant. Tart. in 28 injens. without benefit. Interval—3 months. Blood culture negative after 7 days' treatment. |
| 21 | 25 H. M. | 8 m. | 100° | 5" Nil. | P. N. | 3,100,000 4,100,000 | 2,800 6,200 | 45% 70% | 12 | 2.0 gm. | 7 | 1.2 gm. | 30 | C | Had 3 gm. of Sod. Ant. Tart. in 56 injens. without benefit. Interval—1½ months. Blood culture negative after 12 days' treatment. |

TABLE B.—*Concl'd.*

| Serial No. | Age, Sex, Caste. | Duration of treatment with Antimonyl Tartrates. | Temperature before treatment with Urea Stibamine. | BEFORE TREATMENT. | | | | | Total No. of injections. | Total amount given. | No. of injections. | Total amount after which blood culture was negative. | Period of observation in days after completion of treatment. | Result of treatment. | Previous treatment and interval between this and treatment with Urea Stibamine. |
|------------|------------------|---|---|---|----------------|------------------------|----------------|------------|--------------------------|---------------------|--------------------|--|--|----------------------|--|
| | | | | AFTER PERIOD OF OBSERVATION ON COMPLETION OF TREATMENT. | | | | | | | | | | | |
| | | | | Size of spleen. | Blood culture. | BLOOD COUNT. | | | | | | | | | |
| R. B. C. | W.B.C. | Hb. | | | | | | | | | | | | | |
| 22 | S M. Ch. | 7 m. | 100° 103° | 5" Nil. | P. N. | 3,200,000 4,200,000 | 3,200 7,500 | 50% 75% | 10 | 2.8 gm. | 5 | 1.0 gm. | 60 | C | Had 1.4 gm. of Sod. Ant. Tart. in 40 injens. without benefit. Interval—4 months. Blood culture negative after 10 days' treatment. |
| 23 | 12 M. Ch. | 6 m. | 101° | 5" Nil. | P. N. | 3,000,000 4,200,000 | 2,800 6,800 | 40% 65% | 14 | 2.4 gm. | 12 | 2.0 gm. | 30 | C | Had 2 gm. of Sod. Ant. Tart. in 36 injens. without benefit. Interval—2 months. Blood culture negative after 20 days' treatment. |
| 24 | 16 H. M. | 6 m. | 99° | 4" Nil. | P. N. | 1,900,000 3,900,000 | 1,200 5,800 | 30% 60% | 9 | 1.8 gm. | 5 | 1.0 gm. | 38 | C | Had 2.5 gm. of Sod. Ant. Tart. in 40 injens. without benefit. Interval—2½ months. Blood culture negative after 10 days' treatment. |
| 25 | 30 H. M. | 7½ m. | 100° 101° | 3" Nil. | P. N. | 3,200,000 3,400,000 | 2,500 7,000 | 48% 65% | 6 | 0.6 gm. | 6 | 0.6 gm. | 75 | C | Had 2.6 gm. of Sod. Ant. Tart. in 56 injens. without benefit. Interval—3 months. Blood culture negative after 18 days' treatment. |

Observations.—

(1) The course of treatment with urea stibamine for bringing about cure in kala-azar is remarkably short. In some of the cases cure took place in only seven days. In cases of the antimonyl tartrates the course of treatment frequently extends to more than three months.

(2) The average number of injections required for a course of treatment with urea stibamine is about seven to ten, whereas in the case of antimonyl tartrates it frequently amounts to thirty or more.

(3) The beneficial effects obtained with urea stibamine in cases resistant to the antimonyl tartrates are strikingly shewn in Table B.

(4) Jaundice and albuminuria were no contraindications to the treatment of kala-azar with urea stibamine. Such cases are best treated with small doses, slowly increased.

(5) No signs of intolerance were observed in any of the cases. Sometimes a reactionary fever took place after injection which subsided after a few hours.

(6) Cases in which signs of intolerance showed themselves after injection of sodium antimonyl tartrate bore urea stibamine very well.

(7) The most striking results with urea stibamine are:—

(a) Rapid disappearance of the splenic enlargement;

(b) rapid subsidence of the fever;

(c) early disappearance of the leucopenia; and

(d) the short treatment required for a complete cure.

INTRAVENOUS ANÆSTHESIA IN SURGICAL PRACTICE.

By J. P. ARLAND,
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Indian Station Hospital, Kirkee.

I HAVE used intravenous anæsthesia in my practice with most gratifying results.

The following few cases are cited:—

Case No. 1.—No. 378092, Orderly Mangal Singh of the Overseas Depôt, Kirkee, was admitted to the Indian Station Hospital, Kirkee, on 8th April, 1924, suffering from a chronic sinus on the dorsum of the left forearm, two inches below the elbow, the result of an old badly set fracture.

Conservative measures were adopted with no result. The sinus was freely discharging and the pain was marked. The x-ray picture was very vague and gave no help. I saw the patient

on 9th July, 1924, and decided to enlarge the sinus and explore its depth. Intravenous anæsthesia was adopted.

Technique.—The skin over the median basilic vein was infiltrated with a few minims of a 0.5 per cent. solution of apothesine (Parke, Davis & Co.), and the vein exposed. An aneurism needle was passed under the vessel and a ligature was drawn in place. The arm was next elevated, while at the same time pressure was exerted over the brachial artery in order to prevent blood entering the part, and a tight bandage sufficient to obliterate the brachial pulse applied $2\frac{1}{2}$ in. above the elbow joint. The collapsed vein was lifted up by means of the ligature and 40 c.c. of a 0.5 per cent. solution of apothesine injected against the venous flow. The injection was made under pressure by means of an ordinary 10 c.c. glass syringe with a rubber connection to an ordinary infusion cannula. The cannula having been removed, the ligature was tightened and the wound closed. Anæsthesia was immediate and profound. The sinus was enlarged by an incision 2 in. long and a large sequestrum removed. The control was slowly relaxed and removed. The patient made an uneventful recovery.

Case No. 2.—No. 3556, Sepoy Fateh Mohd. Khan, 4th Bombay Pioneers, was admitted on 3rd July, 1924, for a chronic sinus on the volar surface of the lower half of the left forearm. He stated that he was injured by a sharp plank of wood which broke away inside his forearm on 2nd May, 1924.

Technique.—The technique adopted here was slightly different. The first bandage was applied 4 in. above the elbow joint and a second one 1 in. below. The median basilic vein was exposed and the injected solution confined to the area between the bandages. Anæsthesia was immediate in the area between the bandages and ten minutes elapsed before the part below the distal bandage was anæsthetic. An incision $1\frac{1}{2}$ in. was made, the muscles separated and an irregular piece of wood $3\frac{1}{2}$ in. by 3 in. was removed. The patient made a rapid recovery.

Case No. 3.—No. 9496, Sapper Gajab Bhanze, Royal Bombay Sappers and Miners, was admitted to the Indian Station Hospital, Kirkee, with multiple sores on his penis. Circumcision was decided upon.

Technique.—The skin at the root of the penis was infiltrated with 0.5 per cent. apothesine and the deep dorsal vein of the penis exposed. The vein was lifted by means of an aneurism needle and a ligature drawn into position. Twenty-five c.c. of a 0.5 per cent. solution of apothesine was injected and the ligature tightened. A soft flexible rubber catheter was tied round the root of the penis to prevent some of the anæsthetic solution escaping by the superficial dorsal vein and other small branches. Anæsthesia was instantaneous and profound. The patient was discharged cured.

Case No. 4.—My bearer, Velu, was stung by a scorpion on the pulp of the right thumb. The pain was very severe and according to him was ascending up the forearm. He was taken to the hospital and the median basilic exposed by infiltration with a 0.5 per cent. solution of apothesine.

The arm was elevated, pressure made on the brachial artery and a tight bandage applied 3 in. above the elbow to obliterate the arterial flow: 40 c.c. of a 0.5 per cent. solution of apothesine was introduced into the vein, which was then ligatured. The pain disappeared instantaneously. The bandage was kept in place for 30 minutes, after which it was slowly relaxed. Pain had completely vanished.

Case No. 5.—No. 3574, Isascar Gini Appalawamy of the Indian Ordnance Department, was admitted to the Indian Station Hospital, Kirkee, on 19th September, 1924, suffering from gangrene of the right foot. It was decided to amputate the leg in the lower third.

Technique.—The great saphenous vein was exposed by infiltration with a 0.5 per cent. solution of apothesine behind the femoral condyle, and a ligature was drawn under it. The leg and thigh were elevated while the femoral pulse was obliterated by digital pressure. After a few minutes the limb was lowered and a broad bandage was applied 3 in. above the knee sufficiently tightly to prevent the blood entering the leg. The vein was drawn up by means of the ligature and 40 c.c. of a 0.5 per cent. solution of apothesine injected. Anæsthesia was immediate and the leg was amputated. The patient recovered.

Case No. 6.—No. 19455, Sapper Sakaram Savant, Royal Bombay Sappers and Miners, was admitted to the Indian Station Hospital, Kirkee, on 21st October, 1924, suffering from a large palmar abscess of the left hand.

Technique.—A small vein 1 in. above the wrist on the volar surface was exposed and a ligature drawn in place. The hand was elevated and a tight bandage applied 3 in. above the wrist. The vein exposed was injected with 25 c.c. of a 0.5 per cent. solution of apothesine. Anæsthesia was perfect and the abscess was opened. The patient recovered.

Practical Points.—

(1) The limb is rendered ischæmic, because the saline constituents of the blood interfere with the proper action of the anæsthetic.

(2) The control bandage must be sufficiently tight to obliterate the arterial and venous flow, thus preventing the blood from entering and the solution from leaving the part.

(3) It is important to inject the solution under pressure.

(4) The control bandage is to be slowly relaxed and removed.

(5) For major operations a preliminary injection of morphia and scopolamine is to be administered.

(6) The apothesine solution must be prepared with distilled water.

(7) Esmarck's rubber bandage, applied to the limb from below upwards, is an excellent means of rendering the part bloodless.

[Note.—Lieut. Arland's book on "Local Intravenous Anæsthesia in Surgical Practice" is about to be published by Messrs. Baillière, Tindall & Cox. Editor, I.M.G.]

QUININE PLUS ALKALIES IN THE TREATMENT OF MALARIA.

By K. V. RAJU,

M. & S. M. Railway Hospital, Hubli.

It was with great interest that I read Major Sinton's recent article in the *Indian Medical Gazette* on this line of treatment, as his reasons for such a line of treatment appeared to be very convincing, and accordingly, with the approval of my chief medical officer, I commenced a trial of the method on in-patients in hospital and on educated and intelligent out-patients.

As soon as a patient is admitted to this hospital for "fever," it is the routine practice to examine his blood microscopically. It is surprising how many patients who are clinically typical cases of malaria give negative findings in blood films. These patients get their regular paroxysms of fever, each typical of an attack of malaria, with all its stages, and yet examination of blood films often fails to shew the parasites. The reason probably is that when such a person falls ill, his first procedure is to take an aperient, and if this fails to reduce the fever, to take a dose of quinine. It is only when both measures fail that he calls in a doctor or comes to hospital, and he does not understand that, in taking a preliminary dose of quinine, he is rendering accurate diagnosis by the doctor doubly difficult.

I have accordingly divided the cases here reported on into two groups:—(a) Those in which malarial parasites were found in the blood films, i.e., proved malaria; and (b) those which were clinically typical of malaria, but in which examination of two or more blood films on different occasions failed to shew parasites.

The routine treatment of "fever" at this hospital is, first, to administer a saline aperient, and then await the onset of a rigor in order to take blood films for examination, if the patient has given a history of rigors.

The treatment was carried out in accordance with the instructions given by Major Sinton; using his alkaline mixture (for an adult: sodium bicarbonate 60 grs., sodium citrate 40 grs., and water to 1 oz.), and his quinine mixture (for an adult: quinine sulphate 10 grs., citric acid 30 grs., magnesium sulphate 60 grs., with water to 1 oz.). On

the first day 4 doses of the alkaline mixture, and 2 of the quinine mixture are given, the latter on each occasion 15 minutes after the alkaline mixture; for the next 4 days, 3 doses a day of the alkaline mixture, followed after a 15 minutes' interval by 3 doses of the quinine mixture; and for the next 2 days, 2 doses of alkaline mixture, followed after a 15 minutes' interval by 2 doses of the quinine mixture; the patient taking in all during the week 180 grains of quinine sulphate in solution. In every case the patient's blood has been examined before his discharge from hospital, and was invariably found to be negative.

Brief Notes on the Cases Treated.

(a) *Malaria proved microscopically*; 19 cases; 17 of them in-patients.

Case 1.—Afebrile after 40 grs. of quinine. Given 70 grs. in all. Discharged 9th day.

Case 2.—Afebrile after 20 grs. Discharged 8th day.

Case 3.—Afebrile after 20 grs. Discharged 8th day.

Case 4.—Afebrile after 50 grs. in two days; the fever had been quotidian. Discharged 8th day.

Case 5.—Afebrile after 20 grs. The fever had been quotidian; mixed benign and malignant tertian infection. Crescents still found in the blood after 100 grs. had been given. Discharged 12th day.

Case 6.—Afebrile after 20 grs. Mixed benign and malignant tertian infection. Discharged 8th day.

Case 7.—Afebrile after 40 grs. Benign tertian infection. Discharged 10th day.

Case 8.—Afebrile after 20 grs. Benign tertian infection. Discharged 8th day.

Case 9.—Afebrile after 20 grs. Discharged 7th day.

Case 10.—Afebrile after 20 grs. Discharged 9th day.

Case 11.—Benign tertian infection; still febrile after 40 grs.; then developed small-pox.

Case 12.—Afebrile after 20 grs.

Case 13.—Afebrile after 20 grs.

Case 14.—Still febrile after 50 grs.; patient refused to stay in hospital for further investigation.

Case 15.—Afebrile after 50 grs.

Case 16.—Out-patient. Benign tertian infection; afebrile after 50 grs. in two days.

Case 17.—Out-patient. Malignant tertian infection; afebrile after 50 grs. in two days. Subsequently relapsed; now under treatment again.

Case 18.—Mixed benign and malignant tertian infections; given 10 grs. of quinine hydrobromide intravenously in 20 c.c. of water; fever then stopped; discharged 8th day. Blood pressure at the time of the injection 95 mm.

Case 19.—Benign tertian infection; treated with acid quinine sulphate mixture; afebrile after 30 grs. Discharged 7th day.

(b) *Cases clinically malaria; but no parasites found in films*; 11 cases.

Case 1.—Afebrile after 60 grs.

Case 2.—Tinct. Cinchona Co., 5 drms. given; later 1 dr. quinine sulphate; still febrile with nausea and sickness. On 8th day given 10 grs. quinine hydrochloride intramuscularly; afebrile subsequently.

Case 3.—Afebrile after 20 grs. Discharged 7th day.

Case 4.—Afebrile after 20 grs.; spleen very much enlarged. Discharged 10th day.

Case 5.—Fever for three weeks with previous irregular quinine treatment; afebrile after 50 grs. Discharged 9th day.

Case 6.—Afebrile after 20 grs.

Case 7.—Two rigors in hospital before commencing treatment; afebrile after 20 grs.

Case 8.—Marked nausea on the quinine and alkaline treatment; given 10 grs. of quinine hydrochloride intramuscularly; fever stopped thereafter. Discharged 10th day.

Case 9.—Afebrile after 50 grs. in two days.

Case 10.—Quartan temperature chart; afebrile after 50 grs.

Case 11.—Afebrile after 50 grs.

CONCLUSIONS.

(1) As the doses of the two mixtures have to be given according to a strict time-table, the method is more suitable for in-patients than for out-patients.

(2) In the 17 cases of proved malaria in the first series treated with the quinine and alkaline treatment alone, the patients became afebrile after 20 grains of quinine in 9 cases; after 40 grains in 2 cases; and after 50 grains in 4 cases. Crescents were still found in a patient who had taken 100 grains.

(3) In the 9 cases of clinical malaria in the second series, treated with the quinine and alkaline treatment alone, the patients became afebrile after 20 grains of quinine in 4 instances; after 50 grains in 4 instances; and after 60 grains in 1 instance.

(4) In the majority of cases the mixtures are well tolerated, whilst there is the additional psychological effect of giving two mixtures instead of one to illiterate patients.

(5) Although all these patients were instructed to return to the hospital if fever recurred, the only one who did so was the patient who had received an intravenous injection,—Case 18 of the first series,—33 days after the injection. He was now placed on treatment with quinine and alkalies, and was discharged well on the 10th day.

(6) We are now trying the combined quinine and alkali treatment side by side with treatment with the ordinary acid quinine sulphate mixture as a control.

(7) The scantiness of parasite findings is a feature of the series. If there is any drug which could be administered to drive parasites into the peripheral circulation, it would be of benefit to know of it; arecaline hydrobromide is said to possess this property, but I have been unable to secure this drug from any chemist.

In conclusion I have to thank my officers, Dr. A. I. Jackson and Dr. C. A. Kirton for encouragement in this work and for assistance in the publication of these cases.

[Note.—According to James, ("Malaria at Home and Abroad"), if a single blood film from undoubted malarial cases be examined, parasites are only found in some 40 per cent. of cases; the use of the thick film as a supplementary measure—using the technique advocated by Knowles and Das Gupta, *Indian Medical Gazette*, September, 1924, much improves the percentage of positive findings.—EDITOR, J.M.G.]

CHOROIDAL HÆMORRHAGE FOLLOWING CATARACT EXTRACTION.

By M. M. CRUICKSHANK, B.Sc., M.B., Ch.B.,
CAPTAIN, I.M.S.

THESE notes on choroidal hæmorrhage are based on 30 cases occurring throughout a series of 2,777 cases of cataract extraction done by Dr. Holland of Quetta, and his staff, during two seasons at Shikarpur, Sind, where the incidence of glaucoma is very high.

Tonometry and Choroidal Hæmorrhage.—Perhaps the most striking fact noted with regard to the complications following cataract extraction, was the effect which the routine use of the tonometer had on the incidence of choroidal hæmorrhage. The tonometer used was MacLean's (1). In the treatment of glaucomatous cataract the importance and the necessity of estimating the tension with the tonometer was proved. At best the figures serve only as a rough guide, and in many instances give quite fallacious ideas as to the amount of intraocular tension. More especially is this so in the prominent type of eye, where a certain degree of elasticity gives a false sense of normal tension, the tonometer reading in these cases ranging from 45 mm. to 50 mm. Hg. Cases received in the operating theatre from the out-patient room without any note as to tension were found to give readings of 50 mm. Hg. and more. Cases with a warning note as to tension, sent in for extraction with capsulotomy or for preliminary iridectomy, were on several occasions found to register with the tonometer 100 mm. Hg. or more, and unless for the relief of pain, were refused operation. On the other hand cases sent in with a "cavé tension" were found to be normal and were operated upon in the usual way, the lens being expressed in the capsule, with good results.

What tonometer reading then should decide one in favour of either extraction with capsulotomy or preliminary iridectomy? Holland advises that extraction with capsulotomy should be done in all cases where the limits of normal tension are exceeded, that is where the tonometer registers more than 42 mm. Hg. Where the tension is over 50 mm. a preliminary iridectomy should be done, followed by extraction in the capsule three to twelve months later, the time interval depending on how far the preliminary iridectomy has checked the progress of the glaucoma, perception of light and the pupillary reaction being taken as the indications that the retina is in a condition to admit of hopes of vision. It is doubtful whether anything is to be gained by performing a capsulotomy in these cases.

What is the limit of intraocular tension beyond which a case should be regarded as inoperable? One must regard a tonometer reading of 70 mm. Hg. or over as dangerous, more especially if any degree of arterio-sclerosis with high blood pressure is present. To such a patient, having

perception of light and who is very anxious for operation, one must make it clear that there can be little hope for much improvement in vision and that a serious complication may follow the operation, namely choroidal hæmorrhage. Opinions vary widely on this point. Some would have it that tension has little to do with the onset of choroidal hæmorrhage, pointing to the fact that choroidal hæmorrhage occurs in eyes in which the tension is normal, though it is doubtful if it ever occurs in eyes which are healthy. Advocates of this view operate upon high tension eyes, removing the lens in the capsule with varying results. Others again advocate operation, but after some preliminary procedure has been carried out, such as preliminary iridectomy, or posterior sclerotomy; with removal of the lens later, in its capsule or by the capsulotomy method. Others again would unhesitatingly class such cases as inoperable. If one does operate upon cases in which the tension is high, then it is advisable to perform the operation very slowly. The incision is made slowly, the aqueous being allowed to escape slowly, so that the retinal and choroidal vessels may adapt themselves to the change in intraocular tension. The incision made, it is advisable to place a moist pad on the eye and wait ten or fifteen minutes before making the iridectomy and removing the lens. If Fisher's double hook is used throughout the operation, there will be less tendency for the lens to be shot out of the eye on the completion of the incision, an accident which very frequently occurs if a speculum be used. If the lens tends to extrude itself slowly, it should be allowed to do so unaided. If the lens does not present, then a capsulotomy should be done and the lens substance carefully and gently milked out, or if very gentle pressure with the hook over the lower corneal margin succeeds in starting the lens forward, then capsulotomy can be dispensed with. In a glaucomatous eye one does not wish to run the risk of any post-operative complication, such as iritis, which might be set up by cortical remains in the anterior chamber, and for this reason expression of the lens in the capsule is to be preferred.

Cases Selected to Demonstrate the Value of Tonometry.

1. Tension with fingers plus 1. Sent in for extraction with capsulotomy.
Pupil active. Tension—30 mm. Hg.
Expressed in the capsule.
Result: V = v.g.

I collected over a dozen such cases, which were sent in for preliminary iridectomy or for extraction with capsulotomy, in which the tension ranged from 22 mm. to 40 mm. Hg. In all of these the lens was removed in the capsule with good results.

2. Tension with fingers plus 1. Sent in for extraction with iridectomy.
Pupil somewhat sluggish. Tension = 50 mm. Hg.
After the iridectomy had been made, the lens slowly extruded itself unaided.
Result: not improved.

3. Tension with fingers plus 1. Sent in for extraction with capsulotomy.
Pupil active. Tension = 50 mm. Hg.
Extraction with capsulotomy.
Result: V = v.g.
In comparing cases Nos. 2 and 3 the question might be asked: "Does the extrusion of a lens unaided point to a degeneration of the zonular fibres occurring concurrently with degeneration of the retina?"
4. Tension with fingers plus 1. Sent in for extraction with iridectomy.
This case presented none of the classical signs of glaucoma.
Pupil active. Lens white. Tension = 70 mm. Hg.
Extraction with capsulotomy.
Result: choroidal hæmorrhage: evisceration later.
This was the only case in which choroidal hæmorrhage occurred after the routine use of the tonometer during the 1923 season.
5. Tension with fingers plus 2 (? more.) Sent in for preliminary iridectomy.
Patient stated that he had perception of light. Pupils very sluggish to light. Lens of a sea green hue.
Projection bad. Tension = 98 mm. Hg.
Refused operation.
This is the highest tonometer reading which I have recorded in any case with perception of light.
6. No note with regard to tension. Sent in for expression in the capsule.
Tension = 85 mm. Hg.
In this case a posterior sclerotomy was done, and the lens removed in the capsule. No choroidal hæmorrhage resulted.
Visual result was hand movements at four feet, sufficient to allow patient to find his way about. Thirty such cases were collected, with tonometer readings varying from 55 mm. to 110 mm. Hg. The usual routine in such cases was, if there were perception of light, to perform a preliminary iridectomy. In no case with a reading of 100 mm. Hg. or over was there perception of light, and unless for the relief of pain, operation was refused.
7. Case of double glaucomatous cataract.
R. eye. Pupil active. Tension = 90 mm. Hg.
Vision = Perception of light.
L. eye. Pupil inactive. Tension = 70 mm. Hg.
Vision = Nil.
In the right eye the lens was extracted with capsulotomy, the incision being made slowly and an interval of fifteen minutes being allowed to elapse between the making of the iridectomy and the extraction of the lens.
Result: no choroidal hæmorrhage.
Vision = hand movements.
In the left eye a broad iridectomy was done for relief of pain.
Though, during 1923, only one case of choroidal hæmorrhage occurred after the routine use of the tonometer, yet, during 1924, three cases occurred in which the tonometer reading was within normal limits. Intraocular hæmorrhage may occur immediately after the operation, more usually, however, it occurs a few hours later. It may be slight and cease, the eye being preserved, but with loss of vision, or it may be explosive, the vitreous welling out between the lips of the wound, accompanied by a stream of blood which flows freely over the face, and the grey membrane of the retina may sometimes be seen protruding between the edges of the section (2).

The only treatment is evisceration. Though usually occurring in high tension eyes, it may be brought on by the patient making some exertion, such as getting up, vomiting, straining at stool, etc. It may occur in any eye in which the vessels are sclerosed.

Reviewing the above selected cases it will be seen that tonometry, though a valuable guide, is not the only guide as to the operative measures to be followed in the treatment of glaucomatous cataract, and in the prevention of choroidal hæmorrhage. One must also take into consideration how long the tension has lasted, whether the onset of the tension was sudden or not, and whether or not the patient suffers from arterio-sclerosis with high blood pressure. The degree of tension will matter little if the choroidal vessels are healthy, while a slight increase in intraocular tension in a patient the subject of arterio-sclerosis, will call for great care and judgment. W. R. Parker(3), in a comparative study of results obtained in 1,421 operations, states, that while the three cases of expulsive hæmorrhage reported in his series occurred in patients with advanced arterio-sclerosis, yet "there was no indication that a hæmorrhage was more likely to occur than in any one of a large number of patients with equally severe symptoms on whom a similar operation was successfully performed."

Three cases of choroidal hæmorrhage occurred in my hands in which the tension was within normal limits. One in a man aged 35 years, and two in patients between 75 and 80 years of age. In all three cases the hæmorrhage was not expulsive and the form of the globe was preserved with a clear cornea. In all, pain was complained of before leaving the operating theatre. The onset of such sudden acute pain is pathognomonic of intraocular hæmorrhage. Each was given an injection of morphia gr. $\frac{1}{4}$, put to bed, and warned against drinking any fluid; this in case the fluid might cause the onset of vomiting, not an uncommon concomitant of choroidal hæmorrhage. The increasing intraocular pressure due to the hæmorrhage apparently constricts the choroidal vessels and arrests further bleeding, provided that the hæmorrhage has not been expulsive from the start. In such cases, however, the globe ultimately shrinks to a greater or less degree, depending on the amount of hæmorrhage. In a fourth case, in a man of 65 years, whose intraocular tension registered 50 mm. Hg., pain was complained of immediately after the incision had been completed. Nothing further was done, the eye bandaged, an injection of morphia gr. $\frac{1}{4}$ given, and the patient put to bed. A week later the lens was removed in the capsule by Smith's method, no iridectomy being done, and the eye bandaged for seven days. The patient made a normal recovery, with a circular, clear, black pupil, vision being simply perception of light. There was, however, no hæmorrhage, the complaint of pain after the incision being taken as a warning that the vessels were dilating and tend-

ing to rupture. The intraocular pressure was maintained by leaving the lens *in situ* and bandaging the eye, thus giving the vessels time to adapt their walls to the altered conditions of intraocular tension, the lens being removed seven days later without any untoward results. The tension of this patient's other eye was 32 mm. Hg. The lens in this instance was removed by the Barraquer method, no iridectomy being done, a circular black pupil remaining, the vision being very good. E. E. Maddox(4) reports a case in which he successfully extracted a cataract in the capsule, the patient having lost the other eye as a result of choroidal hæmorrhage. His method consisted in performing a preliminary iridectomy at least one week before the extraction. The patient was suitably prepared, being given calcium lactate the night before and morphia and bromide on the morning of operation. Before commencing the operation, venesection was done and the episcleral veins of the eye pricked. A corneal suture was employed and a gentle pressure bandage applied. After operation hot turpentine stupes were applied to the abdomen and the feet kept warm, to promote circulation of blood in the abdomen and lower extremities.

Hari Shankar of Muttra(5) states that if a small pledget of moist wool is placed on the exposed eye-ball, and gentle pressure exerted backwards on the globe, for about one minute or, as he puts it, "whilst you mentally count two hundred" then "the danger of expulsive hæmorrhage is diminished when the tension is plus and the *vis a tergo* of the vitreous is absent or is reduced considerably."

The Drawn-up or Boat-shaped Pupil.—The drawn-up pupil, which is so frequently seen both after expression of the cataractous lens in its capsule, and after extraction with capsulotomy, cannot be dismissed as the result of a hasty or careless toilet of the wound, though these may play some part in its causation. Even when a complete iridectomy has been made and the pillars of the coloboma carefully replaced, this combination may be seen. It may result from the patient squeezing his lids under the bandage, forcing the aqueous out of the anterior chamber, and thus rolling the edges of the coloboma into the lips of the wound, where they become incarcerated, with the result that the pupil is drawn up. It may be a result of vitreous loss(6). This drawn-up pupil may not interfere with vision in any way, but the cosmetic effect is bad.

Occasionally vision is interfered with, when a second operation has to be undertaken in order to lower the pupil. This little operative measure, Beer's iridectomy, is well worth doing when any interference with vision is present. A thin, preferably worn, von Graefe knife, with a narrow blade, should be used. A transverse incision, about 4 mm. in length, is made in the lower half of the cornea at that point where the lower margin of the new pupil will lie. The blade is

entered flat as in making an incision for an iridectomy. When the counterpuncture has been made, the edge of the blade is turned through a right-angle and brought out perpendicular to the corneal surface. Two points are to be noted in making the incision. First, it ought to be made low down on the corneal surface. The tendency is to make it too high up, with the result that the new pupil is not quite central. One must err then in making the lower margin of the new pupil low rather than high. Second, to ensure that the resulting corneal scar will be so thin as to be almost invisible, the knife must be brought out at right-angles to the corneal surface. To make the new pupil one merely picks up the edge of the drawn-up pupil with a curved iris forceps, and withdrawing it gently from the wound, makes a narrow iridectomy. Col. H. Kirkpatrick(2) states that "the pupil of an eye from which vitreous escape has occurred during a cataract operation has a characteristic appearance, unless the vitreous escape has been reduced and the iris replaced. This is due to the folding back of the iris which occurs. The lower margin describes a wide curve, and the iris is seen to be shaped like a crescent, the inverted pillars of the coloboma, if an iridectomy has been made, forming the horns."

Factors which tend to cause iris prolapse undoubtedly play a large part in the formation of the drawn-up or boat-shaped pupil. Similarly, attention to these details which make for the elimination of iris prolapse will prove of equal value in preventing the drawing up of the pupil after extraction of the lens. As with prolapse of the iris, so with the boat-shaped pupil, both can be eliminated, save for indiscretion on the part of the patient, by removing the lens according to Barraquer's technique. The factors enumerated above as possible causes of the boat-shaped pupil do not, however, entirely solve the problem, and the reason why a drawn-up pupil should go on becoming more and more drawn-up weeks after the wound has healed, till little or no pupil is left, still requires elucidation. This occurred in one case in which I expressed the lens in the capsule by Smith's method. The patient, a Mohammedan, aged about 55 to 60 years, had a slightly drawn-up pupil after operation, but vision was good, and he was discharged and told to return in two months for glasses. In a month's time he came back with a request for glasses. I then noticed that the pupil was very markedly drawn up, but not sufficient to interfere with vision. He was told that he could not have glasses for another four weeks, and he returned to his work in the bazaar. I then lost sight of him for about two months, when he again appeared, this time complaining that he could not see. Examination showed the iris drawn completely upwards across the anterior chamber, leaving a pupil not much larger than a good sized pin's head near the centre of the upper

sclero-corneal margin. He agreed to further operative treatment, and an iridotomy was done, through an incision in the lower third of the cornea, it being impossible to reach with iris forceps the small portion of iris margin remaining free. The result was an irregularly circular, central pupil, roughly 3 mm. in diameter, which, much to his relief, restored to him his vision.

Delirium after Cataract Operation.—W. A. Fisher(7) emphasises the importance of getting a history from old people before operating. If possible a friend should remain with them in hospital, and on the slightest tendency to delirium, they should be awakened. He relates an interesting case of a man who had violent delirium. After being awakened he slept soundly and naturally, and in the morning related a terrifying dream, which he had had during the night, just before the nurse wakened him. Two cases of loss of mental control occurred during the 1924 season. One in an old woman after the intracapsular operation, and the other in an intelligent, though rather neurasthenic Anglo-Indian, aged 52, whose lens had been removed by the Barraquer method. In the first case morphia was tried, but proved useless, the patient becoming normal in her behaviour when the sound eye was released. In the second case, the patient, who apparently was making every endeavour to keep himself under control throughout the operation, broke down the moment both eyes were bandaged, becoming wildly excited, shouting that he was going mad, and making efforts to remove the bandage. The sound eye was released, and the patient regained his mental control, though during the night, despite morphia and chloral hydrate, his wife, who remained with him, reported that he had carried on like a lunatic, having to be coaxed to stay in his bed.

Mercurial Clouding of the Cornea.—This complication, which may or may not interfere with vision, is occasionally seen when the conjunctival sac has been washed out with strong solutions of perchloride of mercury. It is a complication which need never occur, and is avoided by simply washing any excess of perchloride of mercury out of the conjunctival sac with a little sterile water or with saline before the operation is begun. The cloudiness is diffuse and in well marked cases presents a tessellated appearance over the posterior corneal surface. According to Leber, when for any reason the endothelium of Descemet's membrane is destroyed, the aqueous humour infiltrates the corneal substance, which consequently becomes oedematous and cloudy(8). Presumably the strong mercurial solution, passing into the anterior chamber, alters the endothelium on the posterior surface of the cornea. The protective layer being removed, infiltration of the cornea by the aqueous takes place. The condition is unaccompanied by any signs of inflammation, and if slight, clears up without treatment. If severe, a certain amount of opacity will remain, which will interfere with vision, and for which

treatment is useless, though diosmine might be tried.

Striate Keratitis.—Fuchs(8) uses the more correct name of traumatic striate opacity of the cornea. A keratitis implies, at least, an inflammation of the cornea, in which Bowman's tubes, running at right-angles across successive corneal lamellæ, are distended with exudate, the condition seen in a parenchymatous keratitis. In traumatic striate opacity of the cornea there are no signs of inflammation, and there is no interference in any way with the healing of the wound. Some believe that the condition is due to a wrinkling of Descemet's membrane due to the difference in tension in the vertical and horizontal diameters of the cornea, the result of the incision near the corneal margin; others, that it is due to injury to Descemet's membrane during delivery of the lens, more especially when a large hard lens has been forced through a small incision with resulting aqueous infiltration of the corneal substance. T. Harrison Butler(9) using the corneal microscope and Gullstrand's slit lamp, clears away any doubts as to what the condition present on the posterior surface of the cornea actually is. He states:—"In most deep corneal inflammations Descemet's membrane is thrown into folds, and occasionally Bowman's membrane is folded. Such folds are almost constant after any operation upon the cornea, but exactly similar ones are seen in keratitis." This minor complication, which is apparent at the first dressing, is of no significance, requires no treatment, and clears up in a few days.

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A Mirror of Hospital Practice.

AN OBSCURE CASE OF PNEUMOCOCCAL INFECTION.

By A. K. NANDI,
CAPTAIN, I.M.S.,

Senior Medical Officer, East Persian Line, Nushki, Baluchistan.

No. 4850, Sepoy H. K., 4/10th B. Regiment, aged 22 years, was admitted to the Military

Hospital at D. on the 12th February, 1924, complaining of having suffered from fever and an acute pain in the præcordial area of the left side of the chest for the past three days. Cough and expectoration were absent.

On admission his temperature was 100.4° ; pulse 100, very soft and almost thready; respiration rate 36. On examination, the *alæ nasi* did not shew any noticeable movement; the tongue was coated and constipation present; nothing abnormal could be detected on examination of the chest, except that the heart sounds were weak and had a muffled character. There was no clinical evidence of pneumonia.

The constipation having been relieved by calomel and sodium sulphate, the temperature dropped to normal the next morning, but thereafter a continued remittant pyrexia set in, only dropping to normal on the 12th day after admission. The temperature chart was as shewn on p. 218.

Daily examination of the chest failed to reveal anything characteristic. The temperature oscillated between 99 and 102°F. ; the pulse between 80 and 100; the respiration rate between 27 and 40. The patient had lost all appetite, and could only be induced with difficulty to take a few ozs. of essence of meat and two ozs. of brandy, well diluted, daily. He complained continuously of the severe pain in the præcordial area.

On the 16th February, for the first time, examination raised the suspicion of a very faint and very occasional pleuritic rub in the left axillary region. A sinapism was applied and gave partial relief; whilst the constipation had to be continuously treated by saline aperients.

On the 21st February, the patient complained of pain in his feet, both of which were now found to be swollen, owing to bilateral thrombosis. This condition took about two weeks to clear up.

On the 23rd February, the eleventh day after admission, a definite but only occasional pleuritic rub could be detected in the left axilla, whilst the respiratory murmur, vocal resonance and vocal fremitus were diminished over the same area. A slight but insignificant cough now set in, the patient coughing only some four or five times a day, with a scanty, clear and colourless expectoration. This shewed alveolar epithelium, and pneumococci on microscopical examination, but no tubercle bacilli. The case, therefore, appeared to be one of pneumococcal pneumonia, without clinical signs of this disease.

In addition to the usual expectorant mixture, he was given an alkaline potassium iodide mixture orally, and an inhalation containing creasote, turpentine and carbolic acid. The appetite still continued to be very poor. On the 24th February, the temperature came down to 98°F. for the first time since the 13th February, but later in the day he coughed up about a fluid drachm of bright red fresh blood. The sputum was again most carefully examined, but no tubercle bacilli could be found. Hæmoptysis continued for

three days, some three to five times a day, but repeated examination of the sputum failed to reveal tubercle bacilli. He did not cough more than eight times a day at this period. The temperature chart had now become intermittent in character; pain in the chest was still severe; there was some improvement in the condition of the feet; but the cardiac sounds were very weak, and the patient's condition critical. On the 5th March he had a sudden attack of agonising pain in the left side of the chest, and I found him doubled up with pain, drenched in a cold perspiration, and with the pulse extremely thready and scarcely perceptible. Morphia and atropine were at once given hypodermically, and, despite the cardiac condition, were repeated each night in order to secure sleep.

On the 12th March he was evacuated to the

tional in central pneumonia. The profound depressant action of the toxin on the heart was marked from the outset. The sudden onset of pleural effusion with only the very slightest previous indications of pleurisy is a noteworthy feature of the case. The hæmoptysis from the 13th to the 16th day after admission suggested tuberculosis, but repeated examination of the sputum failed to shew tubercle bacilli, and up to the date of writing—28th March—no evidence of tuberculosis has been discovered. Finally, the characters of the pleural exudate were peculiar; a hæmorrhage exudate in place of the usual sero-fibrinous or purulent one.

The onset of a fluid hæmoptysis late in the course of a pneumonia is usually ascribed to streptococcal infection. Post, writing on "focal infection," in Nelson's "Loose Leaf Living

CLINICAL CHART.

Corps... 4/10th BL.

(To be attached to the case sheet.)

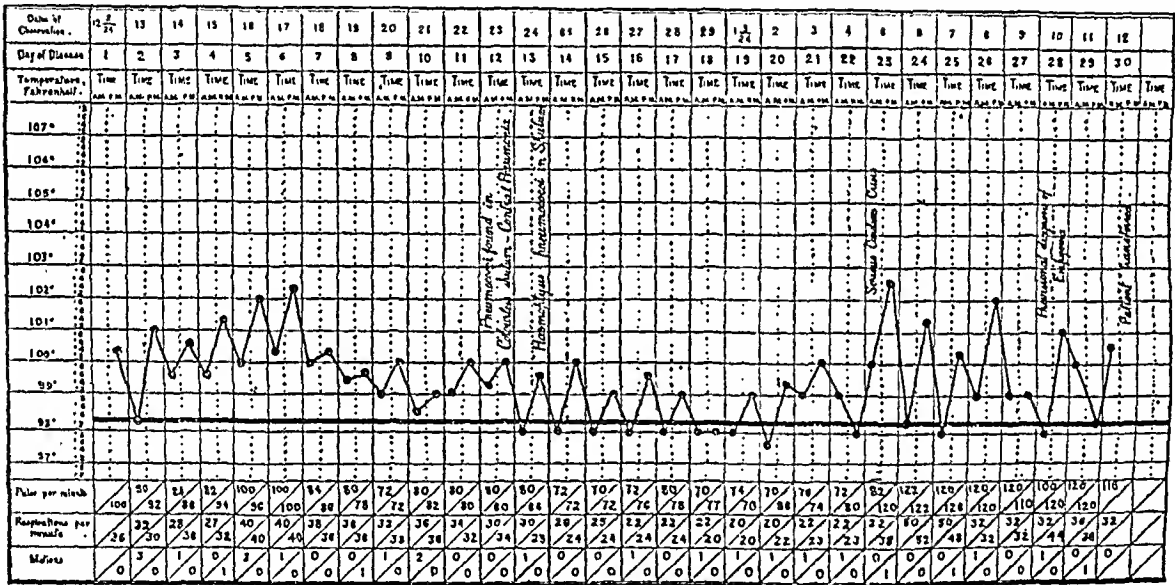
No. 4850.

Rank and Name Sepoy

HK. Age 22 Service 1 year.

Disease Pneumococcal Pneumonia
terminating in Empyema.

Date of Admission 12-2-24. Discharge..... Result Transferred to J.S.H. Quarters 12-3-24



central military hospital of the district. The temperature chart was now of a definitely hectic type, but the cardiac condition was slowly improving. Definite signs of fluid in the left pleural cavity could now be detected, and a provisional diagnosis of empyema was made. The resources of the local hospital, unfortunately, did not permit one to make a total leucocyte count, and this valuable aid to diagnosis was not available. On the 15th March, aspiration of the left pleural cavity withdrew about 32 ozs. of a sero-sanguineous fluid, in which pneumococci were found.

Summary.—The case appears to have been one which commenced as a central pneumonia, of which severe pain in the præcordial region was the only symptom, and without any clinical evidence of the disease. Pain, however, is excep-

Medicine," has suggested the possibility of mutation between these two organisms in closed cavities.

The case is at least one with peculiar characters, and of aberrant type.

AN UNUSUAL COMPLICATION OF TYPHOID FEVER.

By A. T. ROY, L.M.S.,

Hazaribagh.

A YOUNG unmarried Hindu girl, aged 12, had a typical attack of typhoid fever of mild type. At the end of the third week, when the temperature was gradually coming down in typical

step-ladder fashion, spasmodic movements of the muscles of the head and face set in, of sudden onset and sudden disappearance. These spasmodic movements gradually spread over the whole body and extremities, occurring several times during the day and also during sleep at nights. They were always bilateral.

Major Lee, the Civil Surgeon, on consultation, thought that the movements were choreiform in type. Unlike true chorea, however, if the muscles were forcibly held, e.g., those of the extremities, the spasmodic movements at once ceased, only to recur when pressure was discontinued. The spasms would continue for 15 to 30 minutes, but were unattended by any pain, although they left the patient exhausted.

There was extreme constipation at the time, and the urine was very scanty, although the bladder was full. The temperature subsided by the end of the fourth week, but the choreiform movements continued after the fever had subsided. It is to be noted that the father of the child gave a history of rheumatism; she herself was fairly well nourished, and had never previously had such attacks. The menstrual flow had not yet appeared.

Treatment. The constipation and the distended bladder were relieved by mechanical means; and calcium lactate, 15 grs. with parathyroid extract, gr. 1, was given thrice daily. Lemon whey and fresh fruit juices were given. In the course of a couple of weeks the symptoms subsided, and the child is now in good health.

Remarks. Chorea is known to follow acute infectious and intoxications, and is, of course, well known as a complication of rheumatic fever in childhood. The writer, however, has never seen it as a complication of typhoid fever. The severe constipation and scanty urine were marked features of the case, and may have contributed to the onset of the chorea. The choreiform movements having suggested a deficiency in calcium, calcium was administered both orally as calcium lactate, and also in the diet prescribed; parathyroid extract being added in order to assist the calcium metabolism. Vines has shewn that calcium salts are present in the blood in two forms: combined with the plasma, where they take part in blood coagulation; and free, in an ionised form. Biochemists have also shewn that excess of calcium depresses, whilst deficit of calcium increases nervous irritability, magnesium taking the place of the calcium in the latter condition. Harrower has shewn that the activity of the parathyroids governs the calcium metabolism of the body. Hence, in the present case, the indications appeared to be to give calcium salts both orally and in the diet, and to add parathyroid extract.

AN UNUSUAL EFFECT OF MALARIA UPON THE HEART.

By KRISHAN LAL KHERA, M.B., B.S.,

Jaranwala, Lyallpur, Punjab.

S. M., a Hindu male aged 35, consulted me on the 19th December, 1924, complaining of fever coming on daily at 4 p.m. with rigor and passing off at 11 p.m., and of one week's duration. On examination I found the radial pulse on both sides practically imperceptible, with only an occasional beat perceptible. The spleen and liver were both enlarged. On auscultation, the heart was beating exactly as does the foetal heart, with no regular pauses between the sounds, which were weak and scarcely distinguishable from one another. On percussion there was no abnormality in the outline of the heart. With all this, the patient was walking about, complaining of no cardiac symptoms except slight palpitation on walking. The heart was beating at the rate of 210 per minute, and the temperature at the time of examination (9 a.m.) was 98° F.

I put the patient on to quinine, 10 grs. t.d.s. in solution, and on the following morning found that the radial pulse had returned, but was very weak, and at a rate of 90 per minute. He had not had the usual rigor on the preceding day.

On continuing the quinine treatment his pulse rate came down to 82 on the 21st, and the heart sounds were regular and clear, and there was no fever. On the 22nd the pulse rate was 74, with normal heart sounds.

The case illustrates the profound influence of malaria on the cardiac mechanism.

A CASE OF TRIPLETS.

By BINODE KRISHNA BANERJI, M.B.,

*Coomar Charitable Dispensary, Chauditala P. O.,
Hughli.*

I was called in to see a multipara, aged about 22, in her fourth confinement, with a history of previous miscarriage due to cholera. She had lost her husband a month previously, and had had to travel in a railway carriage with slight pains just before the date due for delivery. On my arrival the family doctor informed me that she had had a fit a few hours previously and had been given gr. $\frac{1}{2}$ of morphia hypodermically. The *dai* in charge stated that the os was dilated to one finger width. The patient was exhausted and restless.

On abdominal palpation, a case of twins was diagnosed, and on vaginal examination the os was found to be dilated, with the presenting head low down. Forceps delivery was resorted to, but the child was born in blue asphyxia, probably due to pressure on the cord by the head of the second child. The cord was at

once cut between two artery forceps, and artificial respiration resorted to.

After a second examination, a second child was delivered by forceps; and later a third child "in caul" on pressure on the fundus. A hot douche was given, and an injection of ergotine citrate, and a post-partum mixture prescribed. The placenta was a large one; all three children were of the same sex (female) and equally developed. They all lived for only some 48 hours; the mother, however, made an uneventful recovery.

THE DOSAGE OF ANTI-TETANIC SERUM.

By M. A. KRISHNA IYER, L.M.P.,
Natcharkoil, Tanjore District.

In the October 1924 issue of the *Indian Medical Gazette*, Dr. Nagendra Nath Ghosh reported the treatment of a case of puerperal tetanus with anti-tetanic serum in doses much smaller than those generally recommended or advocated in the text books. Shortly after the publication of his case, I had occasion to deal with two cases of tetanus, one after the other, for which I adopted the same procedure of treating them with small doses of anti-tetanic serum with success. Though there is nothing unusual in these cases, it may be of interest to note that smaller doses of serum than the single massive doses of 15,000 to 20,000 units usually advocated can often be employed with success, and with considerable saving of expenditure.

Case 1. On the 9th October, 1924, I was called to see a woman, aged 30, in a neighbouring village, on the eighth day of her illness. The infection with tetanus had apparently been contracted by the genital route as the result of a miscarriage in the fourth month of pregnancy, some 25 days previously. When I saw her, lock-jaw was complete, and the spasms of the whole body so numerous that I witnessed about 50 attacks during the hour which I spent in attendance on her that day. The temperature was 101.5° F., and risus sardonicus was well marked.

Two hypodermic injections of the serum, each of 1,500 units were given that day; and repeated doses each of 1,500 units on the 10th, 11th and 12th October. The number of convulsions was now reduced, but her condition was otherwise unchanged. The same dose of 1,500 units was again repeated on the 14th, 16th, 17th, 18th and 19th October, the doses being given intravenously.

On the 19th, her condition was markedly improved; two further similar intravenous injections were given on the 21st and 23rd, after which the spasms ceased to appear; she could sit up and take food, and even walk with assistance.

From the beginning the usual bromide and chloral mixture was given. The injections were now stopped, and convalescence was uneventful.

Case 2. This was in a boy aged 9 years whom I first saw on the third day of illness. He had been vaccinated some three weeks previously, and, as I could find no other lesion which could have been responsible for the tetanus, I am inclined to incriminate the vaccination. The symptoms and signs were typical of tetanus, and although the number of spasms was less frequent than in the first case, the opisthotonus posture assumed during each spasm was very marked and continued for some twenty minutes at a time, the boy screaming out during each attack.

I first saw him on the 2nd January, 1925, when the tetanus was of three days' duration, and gave 750 units hypodermically that day. From the 3rd to the 9th January, a daily dose of 750 units was given intravenously. By this time the boy's condition was much improved; he could open his mouth; the spasms were few and of short duration; he could sit up and slept well. Two more intravenous injections, each of 750 units, were given on the 11th and 13th. By the 15th the patient could walk with help, and could take his normal food. In this case also the usual bromide and chloral mixture was given.

As pointed out by Dr. N. N. Ghosh, repeated administration of small doses of anti-tetanic serum may be just as efficacious as the administration of one or two heroic doses. There were no untoward symptoms of any kind in these two cases as the result of giving small doses in place of large; whilst the cost of anti-tetanic serum is so high that large single doses prove very expensive. The serum used in these two cases was that of Messrs. Parke, Davis & Co.

A TUMOUR OF THE ABDOMINAL WALL.

By R. K. BASU,
Assistant Surgeon, Balasore.

M. B., a Mahomedan male, aged about 32 was admitted to the Balasore Hospital on the 27th August, 1924.

Clinical signs on admission.—On inspection, a distinct swelling is visible in the middle of abdomen, more in the lower part than in the upper; on palpation, the swelling is distinctly hard to the touch; its area is 6 in. \times 6 in; the skin is inmovable over it and it is also distinctly tender; no redness of the skin nor any oedema in it. The feeling of the swelling is like that of a solid abdominal tumour; its duration is a fortnight before admission and it is in the same condition as at first; there is no fluctuation in the swelling.

General condition of the patient.—He has no fever; the eyes are sunken; he lies with the thigh flexed; the tongue a bit coated; not much constipated.

Treatment.—The usual applications of glycerine belladonna, iodine, ung. hydrarg co. and plumbi acetat were applied to the skin over the swelling and well bandaged; by the mouth liq. hydrarg. perchlor. $\mathfrak{m}.$ xx; tinct. hyoscyamus $\mathfrak{m}.$ xx in an ounce of water was given thrice daily. On 28th August, 1924, a subcutaneous injection of the following vaccine was given:—*B. coli communis*—100 million, *B. coli communior*—100 million, *B. acid lactici*—20 millions, totalling 1 c.c. of fluid. In the afternoon of the day of injection he had a slight rise of temperature and had the usual uneasiness of fever. On 29th August, 1924, there was a distinct change in the site and position of the tumour-like mass, it extended from the right iliac region to the middle of navel and was hard as before. For his constipation pulv. glycyrrhizæ co. one drgm. was given and a soap water enema—2 pints. A bromide mixture, one dose, was given at night to ease his pain. The next day, 30th August, 1924, he was put on to potass. iodide and hexamine by the mouth. On 1st September, 1924, it was found that the tumour-like mass was reduced to half its former size and the patient's general condition had improved. He was all along kept on sago and barley water; no milk was given. On 4th September, 1924, only a mass 2 in. \times 2 in. was palpable and the abdomen was soft and painless.

On 7th September, 1924, hardly any mass was felt and the man could walk about easily and there were no signs of the swelling; he was discharged cured.

Peculiar points in this case are—the hard tumour-like mass in the middle of abdomen round the navel and its change of size within 2 days of regular treatment; that the *Bacillus coli* vaccine injection appeared to have much to do with the subsiding of that mass; that the inflammatory mass was absorbed without any suppuration, and there was hardly any fever, though the inflammation persisted for such a long time and extended over a fair area of the abdominal wall.

A NOTE ON THE INTRAVENOUS USE OF UROTROPINE.

By Capt. N. N. GHOSH, M.B.,

Civil Assistant Surgeon, Siliguri.

I HAVE used urotropine intravenously for the past two years in a mofussil dispensary, where treatment generally depends upon clinical diagnosis, and where the success or failure of a drug in a particular case is judged by clinical results only. One of the most common

diseases treated in all dispensaries in India is scabies, milder cases of which are cured very rapidly by sulphur ointment, if it be properly applied. But cases of scabies are not infrequently encountered complicated with suppurative lesions almost all over the body, with inflammatory swelling of the extremities and dependent parts, and which take very long to cure with sulphur ointment only.

In such cases I have tried urotropine intravenously with very good results, using a 10 per cent. solution in normal saline, and a dosage of 10 c.c. of this solution daily for three or four consecutive days. During the period of injections, the septic lesions were washed with hot water only. It was found that after three or four such injections, the lesions cleared up wonderfully, and when sulphur ointment was now applied healing was rapid. If the course of injections was not followed up by application of sulphur ointment, the lesions would become pustular again. The sulphur ointment is necessary to kill the burrowing parasite, but the urotropine injections appear to eliminate the secondary sepsis due to scratching.

In these days of injection therapy it is not difficult to get patients to permit intravenous injections, even for such a condition as severe scabies. I have also used urotropine intravenously with apparent good results in suppression of the urine due to cholera, in acute cystitis, and in inflammatory stricture of the urethra.

A CASE OF TETANUS.

By BINODE KRISHNA BANERJEE, M.B.,

Coomar Charitable Dispensary, Chanditala P. O.,
Hughli.

THE patient, a child of $4\frac{1}{2}$ years of age, was sent into hospital in the early morning with information that his tongue had been firmly clenched between his teeth since 10 p.m. the previous night. The father being a *gwalla* (milkman), had secured the services of an *ojha* (devil-exorcist) during the night. On his arrival at hospital I found the child to be suffering from tetanus fits in rapid succession, with a dirty looking ulcer on the brow, some 10 days old, and due to a fall as the source of the mischief. The tongue was black in colour and œdematous. It was released under chloroform anæsthesia with the greatest difficulty, and hardly a drop of fluid could be made to pass by the mouth.

The ulcer was cleaned up and antitetanic serum given; six injections in all,—the first two intravenously. The fits subsided after the second injection, but rectal feeding had to be continued till the 5th day, after which milk

could be taken between the teeth. A bromide and chloral mixture was also given, and the child made a complete recovery. In all 9,000 units of serum were given, the patient's father not being able to afford more. The patient's recovery, even although such an advanced case, is of interest.

A CASE OF TICK TYPHUS.

By Dr. C. E. S. NORMAN, F.R.F.P. & S., D.P.H., L.A.H.,
Chief Medical Officer, S. I. Railway, Trichinopoly;
and

C. S. RAMACHANDRAN, M.B., B.S.,
Assistant Surgeon.

We have read with much interest the articles about tick typhus in the *Indian Medical Gazette*. The following notes deal with a case which is similar to those described. The patient was a retired Indian Army Colonel, aged 60, who arrived in Trichinopoly from Bangalore on 16th December, 1924, where he had been staying 3 months. He was not in contact with any ticks at Bangalore. In the bungalow occupied by him at Trichinopoly he noticed ticks, and said it was quite possible for him to have been bitten by a tick while asleep any time between the 16th December and the 2nd of January, on which date the fever began. The onset was sudden with slight shivering not amounting to ague, and lasting for about 10 minutes, severe headache, pains in all his bones and joints, and pains in his eyes, which became very congested. Severe pains in his abdomen on 3rd January, 1925. These abdominal pains wore off in about 3 to 4 days. Vomited coffee-coloured material on 4th January, 1925. When I saw him on 7th January, 1925, he appeared to have slight jaundice which disappeared in a few days.

The fever was continuous; it lasted 19 days and ended by lysis. The rash appeared on the 3rd day. It was first noticed on the thighs and legs, a few hours later on the abdomen and chest, and then arms. Spots were noticed on his face on the 7th day but were most marked on the 12th to the 14th day. His eye symptoms were most marked on the 12th to the 14th day.

At the onset the rash consisted of discrete purplish-pink spots, fading on pressure. At the height of the disease the rash was distributed on the face, body, thighs, legs, arms, palms of the hands and soles of the feet. Generally speaking the eruption was discrete, but owing to the large number of spots many became confluent, especially on the forearms near the wrists, and near the knees. A few spots on the abdomen became confluent. The spots faded on pressure at first, but later showed a tendency not to completely disappear; this was most marked on the legs and feet, when most of the spots towards the end

of the fever did not disappear on pressure. Some of the older spots seemed to have a tiny depression in the centre. The spots were purplish-pink in colour; this colour changed to a more reddish colour later on and on the legs and feet were pronouncedly dark-red in colour, almost like limited hæmorrhages under the skin, towards the end of his fever. The spots became fainter in colour and smaller in size, but 6 days after his temperature became normal were quite noticeable, least so on his face. He was discharged from hospital on 25th January, 1925. A fortnight after discharge, spots could still be seen on his thighs and legs and some on his abdomen. He went home, and I got a letter dated 16th February, 1925, saying that spots could still be seen.

The senior author first saw this patient on the 6th day. He had marked conjunctival injection and pains in the eyes. The injection and the pains were very bad from the 12th to the 14th day, at the time the rash on his face became most marked. His right eye was exceptionally tender and there was a slight increase in tension. He could not bear any light from the 12th till the 14th day. His eye symptoms rapidly cleared with the abatement of his disease. On the 6th day the liver and spleen were both slightly enlarged and painful; they became normal in size by the 9th day and the pain disappeared. Marked congestion of the throat, hoarse voice, and gums covered with aphthous patches were present. Foul tongue; sleeplessness for first few nights, but the patient appeared drowsy. No albumin in the urine. As far as could be seen lice were excluded. Serum reactions were tested at the King Institute, Guindy. On the 15th day of disease his blood was sent for examination and the following was the result:—

| | |
|---------------------|--|
| Typhoid and all the | negative. |
| paratyphoid group. | negative. |
| Wassermann | .. strongly positive. |
| Weil Felix | .. inconclusive as not enough blood was sent, so a further sample was sent on the 22nd day of his disease and there was a negative result. |

Examination of slides for malaria proved negative. Five slides were sent to the School of Tropical Medicine, Calcutta, for differential count, etc., but the results of examination were not forwarded. There was no evidence as to other cases in the locality.

CORRIGENDUM.

On p. 161 of our issue for last month, April 1925, in Dr. S. K. G. Dastidar's article on "Trichomonas Infection in the Urine," please substitute in the last paragraph, "may cause a mild urethritis, *unattended* with smarting and burning," for "may cause a mild urethritis, *attended* with smarting and burning."—
Editor, I. M. G.

Indian Medical Gazette.

MAY.

THE SUPPLY OF RURAL PHYSICIANS.

IN India the problem of village medical relief is ever before us; it is interesting to find that a very similar difficulty is being experienced in the United States where the wealth of the country might have been expected to render the supply of efficient medical aid an easy matter.

The subject has been investigated by officers of the General Education Board of the United States and all aspects of the question have been closely studied. The upshot of their enquires is that the provision of medical aid is a question of supply and demand. One remedy that has been suggested in America is also advocated in this country; it is to lessen the difficulty and expense of the medical curriculum and to flood the market, so that medical men will be compelled to seek a living in the country. The officers of the medical board have pronounced against this remedy; they hold that the greater attractions of large cities from the financial, social and professional points of view will appeal with equal force to practitioners of every type, and that a lowering of standards will not be effective.

In one respect Indian practice is superior to American; we have considered the possibility of subsidising the country practitioner for the benefit of the community and of lessening the drawbacks from which he suffers in the only way that is likely to be effective, viz., by making his financial prospects better than those of the average medical man in the large cities. The subject is one which ought to be carefully investigated in India; it would be interesting to find whether the graduates of the medical schools go to the country villages in larger proportion than the university graduates; if so an increase in the number of the medical schools will facilitate the solution of our

problem. But we must stipulate that while the education of the medical man may be made more practical and more specially directed towards the work which he is called on to perform, there must be no question of relaxing standards. If medical science is to justify its existence, there can be no question of turning out large numbers of quacks who are recognised as qualified practitioners. The unrecognised quack is harmless in comparison with the man who is sailing under false colours and who does nothing but bring discredit on medical science.

We still more strongly oppose the suggestion that the indigenous systems should be called in to supplement the supply of country practitioners. We have no quarrel with the worthy men who are earning their livelihood by the practice of the indigenous systems, but we must obstinately refuse to take them under our wing. We have quite enough lame ducklings of our own, without assuming responsibility for the still lamer ones belonging to other families. Our business is to set our own house in order and to improve the training of our qualified practitioners, not merely by giving them thoroughly practical courses of pre-graduate and pre-diploma training but also by giving them periodical courses of post-graduate training.

It is not by diminishing the efficiency of our medical men that progress will be secured, but by pushing forward with the work of making them better and more efficient doctors.

THE PREVENTIVE USE OF QUININE.

DR. HAROLD SEIDELIN in the October 1924 number of the *Transactions of the Royal Society of Tropical Medicine and Hygiene* writes on this most important subject. He refers to the tendency among medical men to regard the prophylactic use of quinine as a discredited measure, and he admits that the daily use of small doses of quinine, which is based on the theory that the sporozoites can be destroyed by small quantities of quinine, has not been established as a scientific procedure. He holds that the use of doses of fifteen grains on two days in each week has been proved to

be eminently successful in controlling malaria and he believes that the action of the drug is to kill the parasites at an early stage in their development before they have attained to sufficient numbers to cause clinical manifestations. He has found that the method is not enough to prevent infection and that many of the persons who take the preventive quinine show a few parasites in their blood, but in no case has the disease assumed a severe or resistant form.

It is important that such experiences should be recorded, as the tendency is to abandon one of the means of controlling malaria which has been firmly believed in for many years.

It is likely that some confusion has arisen owing to the known difficulty in sterilising persons who have acquired chronic infections because of delayed and insufficient treatment. It is easy to understand that a number of persons with such chronic infections may be very different material from a similar number of people who have just become infected. In the case of recently infected people short courses of quinine, such as ten days of fifteen or twenty grains daily, will quite probably result in a large proportion of cures, whereas in the case of the old infections such courses would cure only a trifling proportion of the patients. Perhaps too, it may be desirable to give up the use of the term quinine prophylaxis, as it has come to be associated with the fallacy that the sporozoites can be destroyed by much smaller doses of the drug than are needed to destroy the developed parasites. What should be aimed at is really an early treatment of the infection, and the only point at issue is whether it is better to carry out this early treatment on a mass scale, so that in highly malarious places each person would be given a short course of treatment of an effective nature at such a time that the parasites could not possibly have multiplied sufficiently to cause serious damage, and equally important that they should be attacked at a time when they are still confined to the blood stream or to parts of the body which are within reach of the quinine tide which results from the taking of effective doses; or whether it is better to wait until symptoms have appeared

and then carry out a thorough course of quinine treatment. In this connection it would appear that the earlier the treatment is commenced after infection the easier it is to sterilise the patient, and it may turn out that, while a ten days' course is found to be necessary after symptoms have actually appeared, the shorter two days' course may be sufficient within four or five days of the introduction of infection into the body. We grant that there is no complete scientific proof of the view that the parasites can so readily be eliminated immediately after their introduction into the body, but at any rate there is a good deal of evidence that benign tertian infections which have recently been produced for the treatment of general paralysis of the insane are surprisingly easy to cure by short courses of quinine, whereas we have plenty of evidence that chronic infections are most difficult to cure, even by prolonged courses. We have the further evidence that so simple a procedure as the taking of fifteen grains of quinine daily on two consecutive days in each week is sufficient to prevent any serious clinical manifestations of the disease, although frequent infection has been shown to occur, as was shown by the finding of parasites in the blood towards the end of the week and just before the weekly course of treatment was due.

In the cases in which parasites were found, by Dr. Seidelin, a course of ten days' treatment was usually prescribed, but in others it was deliberately omitted without harmful results.

Dr. Seidelin admits that it may be argued that the week-end system is not really a prophylactic but is an "abortive treatment."

It does not matter in the least whether this term or the term "early treatment" be adopted; the result is the control of the disease. The conditions under which such measures are desirable are probably not very common. Mosquito prophylaxis is undoubtedly much superior to quinine control, but in many cases it cannot be carried out effectively. Also the system is not desirable in places where the risk of infection is small, in such cases early treatment after symptoms have developed will probably be more suitable; but in cases in which mosquito control cannot be carried out

and in which the risk of infection is great, the week-end system of malaria control may yet prove to be a very valuable means of keeping malaria from damaging the individual and causing havoc among labour forces.

But the system must be carried out thoroughly or it will be ineffective and will bring quinine into disrepute. We must repeat that it is not enough to write out orders that quinine should be given in certain doses, the mixture must be made up under responsible control and the doses must be swallowed in the presence of some one who is interested in the results of the treatment.

It is hoped that steps will be taken to test the efficacy of quinine in treatments of varying duration in cases in which infection has been produced a few days previously, and in which parasites have just begun to appear in the peripheral blood. It may turn out that these are controllable by much briefer courses of quinine than the older infections. It is also possible that the chronic and resistant infections can be more suitably dealt with by intermittent courses of treatment such as three or four days' treatment in each week than by prolonged spells of quininisation.

SPECIAL ARTICLE.

DISORDERS OF MENSTRUATION.

(In the absence of gross abnormalities such as displacements, neoplasms, inflammations, etc.).

A CLINICAL LECTURE TO POST-GRADUATES.

By V. B. GREEN-ARMYTAGE, M.D., M.R.C.P.,

MAJOR, I.M.S.,

Second Professor of Obstetrics and Gynaecology,
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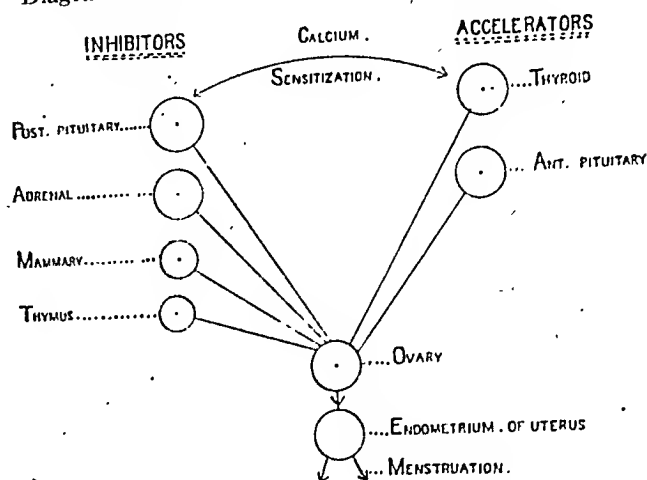
GENTLEMEN,

I have chosen the above title for the subject of our lecture to-day, because of its importance and difficulties in general practice; but, before I begin to speak to you about these cases which I have collected, I wish to make quite clear to you the facts on which our knowledge and treatment are based.

Menstruation may be looked upon as the uterus weeping over the loss of an ovum, and it depends upon an ovarian hormone which is sensitized by calcium. This hormone co-operates with other hormones from the endocrine glands; and it will perhaps make it clearer for you to understand this, if you will imagine that there is a form of executive board in the human female body for its common welfare. Some members of the board are

inhibitors, whilst others are accelerators of menstruation, and both these parties have calcium as their bond of union.

Diagrammatically I can represent it as follows:—



You may ask what proof I have of this. My answer is determined by clinical findings. For instance:—

1. (a) If the thyroid is overworking (as in exophthalmic goitre) we get *menorrhagia*.
(b) If it is deficient (as in myxœdema, delayed puberty, or cretinism) we get *amenorrhœa*.
2. (a) If the anterior pituitary gland secretion is in excess, we get *acromegaly* and precocious genital development.
(b) If it is deficient, we get *amenorrhœa* and non-development of the genitals, and such conditions as an infantile or coehleate uterus.
3. (a) If the suprarenal gland secretion is in excess we get *amenorrhœa* with atrophy of the ovaries.
(b) If it is deficient we get the precocious menstruation of children with hypertrophy of the genital organs.
4. When the thymus gland atrophies, menstruation and ovarian function begin.
If the thymus persists, puberty is delayed.
5. The endometrium controls the excretion of calcium. The proof of this fact is that menstrual blood contains far more calcium than pre-menstrual circulating blood.

If you realise these well-known clinical facts, it is not difficult for you to understand the usual sequence of events which leads up to the monthly discharge from the uterus; for there would seem to be no doubt that what happens is that the calcium content of the blood gradually rises to a certain height. This calcium sensitizes especially the thyroid and anterior pituitary glands, which send a hormone to the endometrium, which in turn fires the trigger of menstruation. When the thyroid, endometrium, and ovaries have expended their energy, the inhibitors function and the process of building up for the next menstrual period begins.

There are three common types of menstrual disorder:

- (1) The *amenorrhœa* of puberty and adolescence;
- (2) the *menorrhagia* of (a) puberty, (b) the reproductive period, (c) the menopause; (3) *dysmenorrhœa*.

(1) *The amenorrhœa of puberty and adolescence.*

The *amenorrhœa* of puberty and adolescence, which is not associated with gross symptoms of anæmia, has three common causes.

(a) The calcium index is below normal, and consequently there is inadequate sensitization of the endocrines.

(b) Under-development of those generative organs which especially depend upon the proper function of the thyroid and pituitary glands.

(c) Lack of endocrine balance,—by this I mean that, either the inhibitors are over-active, or the accelerators are not mature,—the latter being by far the most common.

Treatment consists in raising the calcium index of the patient (1) by diet. Namely, ordering at least 2 pints of milk a day, Sanatogen, eggs, green vegetables (such as cabbage, spinnach, tomatoes, *brinjals*, ladies' fingers, young bamboo shoots), fish roe, underdone meat, home-made butter or *ghee*; liver, kidney, and sweetbread.

(2) By drugs, such as (a) Calcium carbonate, $\frac{1}{2}$ to 1 teaspoonful doses three times a day; (b) Calcium chloride, gr. 1 in 100 minims of sterile water, to be injected intramuscularly twice a week; (c) Parathyroid extract gr. 1/40th, Calcium lactate grs. 5, three times a day (P. D. & Co.).

(3) By prescribing endocrines which stimulate functional equilibrium, e.g., such a prescription as the following:—

| | | | |
|----------------------|----|----|---------------------|
| Thyroid ext. | .. | .. | gr. $\frac{1}{2}$ |
| Whole Pituitary ext. | .. | .. | gr. 1 $\frac{1}{2}$ |
| Whole Ovarian ext. | .. | .. | grs. 3 |
| Acid Carbollic | .. | .. | gr. $\frac{1}{4}$ |
| M. Ft. Pil. | | | |

One three times a day for not less than 6 to 12 weeks. If there is anemia, acid arseniosum gr. 1/60th is added.

(4) General hygienic treatment, such as looking after the bowels, and seeing that fresh air and exercises are taken.

Such treatment as outlined above is equally of value in those cases so frequently encountered before, or after marriage or childbirth.

(2) Menorrhagia.

(a) *The menorrhagia of puberty.*—My private records and experience in Bengal during the last fifteen years very clearly demonstrate that there are two common types of menorrhagia of puberty.

The first is when the periods last too long (i.e., from 10 to 12 days) but are not particularly profuse. This is the type most frequently seen in Bengali girls, and is as a rule due to imperfect development of the uterine musculature and lack of harmony among the executive board of endocrine glands.

The *treatment* of this type is to (1) avoid constipation and diminish the pelvic congestion by mild saline purgatives.

(2) A prescription, such as the Mist Ferri et Mag. Sulph. of all hospital pharmacopœias is useful, and a pill containing:—

| | | | |
|----------------------|----|----|---------------------|
| Thyroid ext. | .. | .. | gr. $\frac{1}{2}$ |
| Whole Pituitary ext. | .. | .. | gr. 1 $\frac{1}{2}$ |
| Acid Arseniosum | .. | .. | gr. 1/60th |

is most efficacious given three times a day for 6 to 12 weeks.

This type of case is rarely benefited by calcium, ergot or curetting.

The *second* type of case, where perhaps the periods are excessive and tend to recur too often, is most frequently seen in Anglo-Indian and European girls. The cause here is due, as a rule, to congestion and over-activity of the ovaries and thyroid. Moreover, the whole modern attitude towards sex matters and housing has to be considered as provocative.

In this type of case you will find that the best treatment is to encourage an open air life with plenty of exercise, early to bed and early to rise, and the avoidance of cinemas and erotic literature.

As regards drugs, a mixture containing iron, bromides, and magnesium sulphate is excellent, together with a pill made up of:—

| | | | |
|----------------------------|----|----|---------------------|
| Ergotine | .. | .. | grs. 3 |
| Whole Pituitary ext. | .. | .. | gr. 1 $\frac{1}{2}$ |
| Ext. Hydrastis. Canadensis | .. | .. | gr. $\frac{1}{2}$ |
| Acid Carbollic | .. | .. | gr. $\frac{1}{4}$ |

One pill three times a day for 8 days before each period, and for the first 2 days of the period.

Calcium, which is so beloved by the general practitioner, is, I am sure, of no use whatever unless it is given in the form of calcium chloride gr. 1 dissolved in 100 minims of sterile water and injected intramuscularly thrice weekly; and seeing that this type of menorrhagia is due to increased calcium sensitization it is obvious that calcium is contra-indicated as a general rule.

Personally, I am a great believer in Swedish drill for these girls, and if they do not quickly react to the above treatment it is best to send them to the hills for a period of not less than three months.

Operations, such as curetting, are very rarely called for, that is if you realise the real cause of the hæmorrhage; for in this type of case such an operation is only of temporary utility; in 280 such cases I have curetted only 11.

Occasionally masturbation is the root of the trouble, and therefore it may be necessary to make careful enquiries.

I see from my notes that in two cases (aged 14 and 16) I had to advise radium application to the endometrium, for in both girls medical and surgical measures had failed entirely. The pathological report after curetting was hypertrophic endometritis in both cases.

(b) *The menorrhagia of the reproductive period.*—All of you realise the extreme frequency of this condition. The causes are many and intimate, and every case will need careful investigation. The commonest causes are:—

1. Ovarian hyperactivity.
2. Coitus interruptus.
3. Prolonged engagements.
4. Contraceptive pessaries.
5. Hyperthyroidism, particularly after childbirth.

The less common causes are erotic literature, cinemas, dancing, climate, and masturbation.

The *treatment* of these cases is:—

Primarily to enquire into, and, if possible, remove the cause.

Secondly, a prescription such as:—

| | | | |
|-------------------|----|----|-----------|
| Mag. Sulph. | .. | .. | grs. 60 |
| Potassium Bromide | .. | .. | grs. 20 |
| Ferri Sulph. | .. | .. | grs. 5 |
| Aqua Menth. Pip. | .. | .. | ad. 1 oz. |

to be given three times a day, combined with the pill previously mentioned of ergot and post-pituitrin for eight days before each period and for the first two days of the period. A cold water enema, combined with very hot vaginal douches during the period, is also useful. If feasible, a change to the hills may be recommended.

If the above measures fail, however, curetting is the only treatment for the thickened and congested endometrium; and here I would again remind you that the cases of which I am speaking are those in which there is no displacement, neoplasm or inflammatory affection of the uterus and its appendages. If curetting fails, then you will have to resort to radium or vaginal hysterectomy.

(c) *The menorrhagia of the menopause.*—You all know how common this is among women over the age of 35, and also how important it is to make a complete examination of the patient in order to eliminate the chances of malignancy or tumour, but, apart from these entities, chronic metritis is extremely frequent, and from a clinical point of view there are two common types of patient; and I am showing you here twenty uteri removed by me by vaginal hysterectomy during the last ten months for this condition.

In one type the uterus is thick, hard and bulky, and in the other type it is thin and small. In both there may be erosions or tears associated with childbirth or abortions and old infections. These patients, you will find, have nearly always been curetted once or twice, and have submitted to practically every means of medical treatment without avail.

Both types of uterus are frequently met with, and as a result chronic metritis has been well named the "clinically malignant uterus," in order to distinguish it from the pathologically malignant uterus.

The treatment of these cases is, to all intents and purposes, hysterectomy; for if the Wassermann reaction is negative, and they fail to react to any medical or minor surgical procedure, such as curetting, they frequently bleed to death, or become so anæmic as to succumb to some secondary infection.

Vaginal hysterectomy is a peculiarly suitable operation for chronic metritis, and for this condition alone I have done sixty such operations during the last five years, with the loss of only one patient.

My own experience of radium for chronic metritis has been disappointing, for an acute inflammatory reaction is not at all uncommon and this leaves the patient in a worse condition than before.

(3) Dysmenorrhœa.

Painful menstruation is to-day divided into (1) that form which has some extrinsic cause, such as tumour, displacement, or inflammatory condition of the generative apparatus; and (2) that which is of the intrinsic type, where pelvic examination shows very little deviation from the normal, and consequently you are apt to assume that everything, anatomically and physiologically, is as it should be.

There are four common types of dysmenorrhœa frequently met with, i.e.:—

1. Dysmenorrhœa of puberty and adolescence.
2. Dysmenorrhœa of the early reproductive period of married life.
3. Dysmenorrhœa of the late reproductive period of married life.
4. Dysmenorrhœa of the menopause.

1. *Dysmenorrhœa of puberty and adolescence* is frequently found in anæmic school girls, typists, shop girls, factory hands, etc., and is the cause of much anxiety and loss of working hours.

Some of these cases are associated with a lack of calcium and thyroid and pituitary secretions, or a lack of harmony between the inhibitors and accelerators. Others are due to under-development of the uterus and cervix, which maintains the anteфлекed or retrofleked cochleate condition of pre-puberty days with its snout-shaped, pin-hole, or button cervix. Others again are merely secondary to occupational duties which result in poor abdominal musculature, constipation, and congestion of the ovaries.

The treatment of these cases is:—

(1) Hygienic, i.e., to promote an open air life, Swedish exercises and open bowels; and during, or just before the period, hot foot or hot sitz-baths.

(2) Increase the iron and calcium index by diet or drugs as suggested under the heading *amenorrhœa of puberty*.

(3) Prescribe a pill made up of:—

| | | |
|----------------------|----|---------------|
| Thyroid ext. | .. | .. gr. 1 |
| Whole Pituitary ext. | .. | .. grs. 2 |
| Whole Ovarian ext. | .. | .. grs. 3 |
| Acid Arseniosum | .. | .. gr. 1/60th |

One pill twice a day which should be taken for a period of not less than 6 to 12 weeks.

For the actual pain there are a hundred drugs which are frequently prescribed,—an excellent indication of their uselessness. Personally, I order one of three, e.g., either antipyrin grs. 15, four hourly for four doses; or *fig. sedans* drs. 2 before and during the period; or luminal gr. 1 three times a day.

If all these methods fail after a prolonged trial, operation, dilatation, and curetting may be advised, but it is well to remember that unless the dilatation is done properly (to at least Hagar 9/12) it is rarely of use. Moreover, it is a useful clinical fact to remember that if there is any difficulty in slowly dilating up to this

size, the patient will probably be cured, but if the dilatation is easy, your operation will not relieve her.

You must remember that the so-called 'pin-hole' os does not of itself cause dysmenorrhœa, for the under-developed snout-shaped cervix and cochleate uterus with which it is associated is the real cause. Nor must you forget that the severe dysmenorrhœa of puberty and early married life is often associated with maldevelopment of the uterus and is one of the causes of sterility.

Stem pessaries are not to be recommended.

Very occasionally, in very severe cases, I have done what is spoken of as an anterior hysterotomy.

2. *Dysmenorrhœa of the early reproductive period of married life.*—This condition is most often associated with a very congested and thickened endometrium due to excessive coitus, or sub-involution of the uterus following childbirth, or some low-grade inflammatory infection of the uterus.

The treatment consists in very hot rectal and vaginal douching twice a day, and, if this fails, dilatation and curetting will probably be necessary, followed by iodised-phenol swabbing of the interior of the uterus.

Remember, if there is an inflammatory infection of the tubes and ovaries, under no circumstances should curetting be done, for, if you do so, an exacerbation of acute salpingitis is probable.

Careful enquiry as to a previous history of acute abdominal pain, fever, discharge, or possible dysuria, will give you the necessary clue, and a careful vaginal or rectal examination should elucidate the position of the uterus, and whether it is tender and fixed, or whether the tubes and ovaries are enlarged and matted together.

3. *Dysmenorrhœa of the late reproductive period of married life.*—This is frequently due to a fibroid or polypus of the uterus, or to a thickened endometrium or salpingitis, or may possibly be the commencement of one of those peculiar tumours which we speak of as a recto-vaginal adenomyoma.

Such cases should be referred to a specialist for opinion.

4. *Dysmenorrhœa of the menopause.*—This may be due to chronic metritis, or to a fibroid polypus, and sometimes is associated with commencing carcinoma of the body of the uterus.

Any case of this type of dysmenorrhœa should at once be referred to a specialist.

Current Topics.

The Microscopic Diagnosis of the Dysenteries at their onset.

By Dr. FRANK G. HAUGHWOUT.

Jl. American Med. Assoc., October 11th, 1924, p. 1156.

DR. HAUGHWOUT claims that in Manila he is able not only to make a correct diagnosis of the condition within two or three hours of the onset, but that the administration of serum is attended by exceedingly satisfactory clinical results. This is accomplished by the microscopic inspection of the cellular exudate, which affords criteria that enable a quick and reliable diagnosis of bacillary dysentery to be made, and sharply differentiates it from the protozoal dysenteries.

Until recently, the American literature has laid the greater stress on the relatively rare amoebic dysentery, until it has almost submerged the greater problem, bacillary dysentery.

Three essentials are involved in the successful management of a case of dysentery:—

1. Its differentiation from acute diarrhœa or other gastro-intestinal disorders of non-specific origin.

2. The early and accurate determination of the type of dysentery—whether bacillary or protozoal.

3. Prompt, adequate and sustained treatment with the appropriate remedy as indicated by the laboratory findings, together with the treatment of accompanying complications. This should be succeeded by a period of microscopic supervision during the post-dysentery stage, and until such time as microscopic evidence of ulcerative process is no longer obtainable. This applies to bacillary as well as protozoal dysentery.

A fatal outcome in dysentery, usually is due to one or more of the following causes:—

1. Delay on the part of the patient in seeking medical advice.

2. Failure to make a correct differential diagnosis, and, in consequence, treatment by the wrong method.

3. Failure promptly to administer treatment in adequate dosage.

4. Failure to treat complicating symptoms, such as dehydration in severe bacillary dysentery.

5. Inability to cope with early developing and overwhelming toxemia as seen in fulminating bacillary dysentery.

6. Neglect of secondary infections supervening on a primary bacillary or protozoal dysentery. This last contingency is by no means rare, and is responsible for the loss of many patients and the prolonged invalidism of others, who have weathered the storm of their dysentery.

Differentiation.—Bacillary dysenteries caused by the Flexner strains of *Bacillus dysenteriae* frequently give rise to constitutional symptoms so mild that clinical differentiation of them from those of amoebic dysentery is a practical impossibility. The rise of temperature is evanescent and may not exceed 1 degree Fahrenheit. Prostration is not marked and there are no recognizable symptoms of toxemia. In short, the general clinical picture is essentially similar to that of amoebic dysentery.

In these days, when the microscopic diagnosis of dysentery can be made so rapidly and so accurately, there is no longer any reason why the final diagnosis should not be made in the proper place—the laboratory, and at the proper time—immediately after the onset of the disturbance.

Dr. Haughwout is able to confirm the findings of Willmore and Bahr and Anderson and others, and has been able to supplement them with observations of his own on bacillary and amoebic dysentery as well as on balantidial dysentery, post-dysenteric colitis and various types of non-specific colitis and other pathological conditions in the colon.

The underlying principle of the method rests in the recognition of the two types of dysentery through the medium afforded by the cellular exudate that is produced as an expression of the pathological conditions of the two processes. Bacillary dysentery is an acute, toxic, inflammatory involvement of the colonic mucosa caused by *Bacillus dysenteriae*. In consequence it gives rise to a rich, purulent exudate, consisting mainly of polymorphonuclear leucocytes (about 90 per cent.) and phagocytic endothelial macrophages. Other cells are present in small numbers. A large proportion of all these cells bear the marks of toxic necrosis, and stigmas that are characteristic of bacillary dysentery and no other intestinal disorder. On the other hand, amoebic dysentery produces an exudate that bears a definite relation to the amount of secondary bacterial infection present, but which is always so scanty in volume and so lacking in the characteristics of bacillary exudates that no confusion can possibly arise.

Diagnosis.—The diagnosis of bacillary dysentery rests on the finding of an exudate exhibiting the characters already mentioned; that of amoebic dysentery rests on the discovery of active tissue-dwelling forms of *Entamoeba histolytica* containing ingested red blood corpuscles in surroundings that make it clear that *E. histolytica*, and no other agent, is responsible for the dysenteric symptoms. Bacillary dysentery super-

imposed on an amoebic dysentery produces an exudate of its own that is so massive and striking that it completely submerges the unobtrusive amoebic exudate, which is quite proper since, under these conditions, treatment is first directed toward the bacillary involvement, the less urgent amoebic process being dealt with later.

In the exudate of a case of bacillary dysentery the general background of the field is made up of polymorphonuclear leucocytes (neutrophils) in a marked state of toxic degeneration. Cellular damage, it will be noted, is quite uniform, nuclei and cytoplasm being equally involved. The nuclei of the leucocytes will be seen to have undergone the rather familiar annular degeneration, which, however, appears often to be especially marked in bacillary dysentery, although it is, of course, not a distinguishing characteristic of that condition. Other types of cells, as well as erythrocytes, will be seen to be distributed about the field. Prominent among the cells are numerous oval to elongated, and sometimes lobed cells, about twice the size of the polymorphonuclear leucocytes. Rounded to irregularly shaped dark staining masses lie in the cytoplasm of these cells. The darker of these bodies probably represent the remnants of cell nuclei that have been broken down in the process of toxic necrosis; the more lightly stained bodies that appear to lie in clear, vacuole-like spaces are erythrocytes that have been phagocytosed by the endothelial cells. Smaller, mono-nucleated cells of the plasma cell type, as well as extremely degenerated cells of uncertain origin, almost denuded of cytoplasm and nuclei, are in the field. The latter express the extreme effects of the toxic process produced by *Bacillus dysenteriae*, and are known as "ghost-cells." When bacillary dysentery exists, the polymorphonuclear leucocyte—endothelial macrophage—ghost-cell combination always can be assembled on microscopic study of the exudate; and the microscopist is completely justified in rendering a diagnosis of bacillary dysentery to the clinician. The author has never yet seen *Bacillus dysenteriae* recovered from a purulent bowel exudate that did not contain endothelial macrophages. Therefore, they always must be sought for, because occasionally one encounters cases in which a heavy purulent exudate is produced in connection with the activities of some bacterial organism other than *B. dysenteriae*.

A totally different picture will be found in the muco-sanguinolent exudate passed by a patient who is suffering from an acute attack of amoebic dysentery.

The central figure in this picture is, of course, the trophozoite of *Entamoeba histolytica*. It will be seen to contain a number of partially digested erythrocytes. Charcot-Leyden crystals may be seen. Virtually all the other bodies in view are erythrocytes, which are to be recognized as the darker, homogenous, circular to elongated bodies. Other cells will easily be recognized by their nuclei, but few of them will be seen.

So far as we have evidence, no toxin is produced by the protozoon, and it is incapable of producing an inflammatory reaction *per se* in the tissues.

The consequence is that no particular type of cell is called forth from the wall of the intestine, and such cells as find their way from a small amoebic ulcer and into the mucoid discharge are very apt to show evidence of the action of the digestive ferments at their periphery, and under the microscope look very much as if pieces had been bitten off them. The nucleus is the last portion of the cells to be affected, and, as a result, the exudate of amoebic dysentery contains many of these partially destroyed cells—some of them consisting of little more than the nucleus, with a small remnant of the cytoplasm still adhering to it. These are called "pyknotic bodies." They are characteristic of protozoal dysentery, balantidial as well as amoebic. However, no diagnosis of amoebic dysentery should be made except on the finding of motile, tissue-dwelling forms of *Entamoeba histolytica*. The identification of this species in the presence of acute amoebic dysentery is not at all a difficult matter if one is working with fresh material.

The amoebæ are exceedingly active, showing lively movements of progression. If such amoebæ are found that contain erythrocytes in an active state of circulation in the endoplasm, they may for all practical purposes be designated *E. histolytica*, and the microscopist may rest serenely confident that he has made no mistake.

Endothelial macrophages need never be confounded with amoebæ. To begin with, they occur in a heavy leucocytic exudate such as one never sees in amoebic dysentery; moreover, they are not motile, and the erythrocytes which many of them contain do not circulate about in the containing cell, but instead lie passively in vacuole-like spaces that are sharply marked off from the remainder of the endoplasm.

In amoebic dysentery complicated by heavy secondary bacterial infection of the amoebic ulcers, the leucocytic exudate cannot be mistaken for that of bacillary dysentery.

A few trophozoites of *Entamoeba histolytica* containing ingested erythrocytes may be seen, the stool contains bacteria in enormous numbers. The deeply staining round to elongated bodies are erythrocytes. Scattered over the field are a number of polymorphonuclear leucocytes. It will be noted that in the main these are intact. That is to say, they show no evidence of the toxic degeneration that characterises the leucocytes of bacillary dysentery; likewise, very few of them show the evidence of proteolytic digestion characteristic of protozoal dysentery. In other words, most of them are leucocytes derived from bacterially infected amoebic ulcers. Endothelial macrophages and "ghost-cells" are totally lacking in the microscopic picture. In short, even in the face of the numerous leucocytes, brief inspection of this exudate will serve to distinguish it, beyond all doubt, from the exudate of bacillary dysentery.

In his summary, Dr. Haighwout states that the exudate of bacillary dysentery becomes organized within an hour or two of the onset of the first acute symptoms. It is characteristic of that disorder and of no other intestinal disturbance. It is readily recognised by a microscopist of even small experience, and it furnishes a perfectly safe and reliable guide to appropriate treatment.

Application of the principles outlined above ensures an accurate and early differential diagnosis in dysentery, and in the case of bacillary dysentery makes it possible to apply specific treatment at the time when it will do the most good. It is equally accurate in amoebic dysentery.

The uncertainty and delay contingent on the diagnosis of bacillary dysentery by the method of bacteriological culture is abolished. For practical purposes of treatment, the method of cyto-diagnosis is more expeditious, more accurate and more dependable.

Cardiac Irregularities; especially with reference to Prognosis and Treatment.

By T. WARDROP GRIFFITH, C.M.C., M.D., F.R.C.P.,
British Med. J., October 18, 1924, p. 697.

AURICULAR fibrillation is a very common and serious form of irregularity.

We know that the presence of a pulse which has no recognizable rhythm, which is indeed non-rhythmical, carries with it the sure inference that it owes its lack of rhythm to this condition. The behaviour of the auricle is such that, while it loses all power of propulsion of the blood, it showers irregularly towards the auriculo-ventricular bridge hundreds of stimuli of which probably many never cross the bridge, and of those that do some may be so weak as not to elicit any response. Those that do cross and are strong enough to elicit a response reach the ventricle at irregular intervals, and, in harmony with the "all or nothing" behaviour of the heart pointed out by Bow-

ditch, the contractions will be the fullest efforts of which the ventricle is capable at those particular moments when the stimuli reach it. The condition may be detected only when for some reason a routine examination of the heart is made. On the other hand, the majority soon complain of dyspnoea and have the usual symptoms of cardiac failure combined with the characteristic non-rhythmical pulse with numerous imperfect beats, many of which do not reach the wrist even if they succeed in opening the aortic valve. We now know that the influence of digitalis in depressing the conductivity of the junctional tissues is especially developed in cases of auricular fibrillation, and that it is this property which makes it such a useful drug in the treatment of the cardiac failure with which it is associated. A large number of stimuli which would formerly have passed to the ventricles, goading them into contractions for which they were unprepared, are now arrested. Those stimuli which do reach the ventricles are separated by longer intervals; the ventricles have longer to recover and respond by stronger and more effective contractions. It is to be noted that the fibrillation of the auricles continues—indeed it is said that the use of digitalis tends to its perpetuation—and that the arrhythmia persists.

Dr. Griffith uses the tincture in doses of 10 minims every four hours or oftener. Sometimes the drug may cause a degree of heart-block which becomes complete, and in some cases during the development of this there have been no untoward symptoms; but this consumption should be avoided as excessive and not devoid of danger. When the action of the heart becomes infrequent under the influence of the drug, extra-systoles of ectopic origin begin to show themselves.

It is clear that in a certain number of cases the normal rhythm of the heart is restored by the use of quinidine. The answer to the question whether it should be used must depend upon the answers to the following: "What is the value of the restoration of the normal rhythm?" and "What are the dangers?"

The restoration of the normal rhythm will tend to equalize the amount of blood the ventricles have to deal with at each beat, and the regular call on their activities, one would think, must be favourable.

In harmony with these views, it is found that many of the patients express themselves as much better.

It is certainly the case that many unpleasant and some dangerous symptoms may arise after moderate doses of the drug, even when the precaution of test doses has been employed. Among these may be mentioned nausea, vomiting, palpitation, giddiness, faintness, flushing, convulsions, syncope, apnoea, dyspnoea, and other signs of cardiac failure. The selection of suitable cases is important. Those of short duration without great manifestations of cardiac failure do best, as might be expected.

The question of dealing with cases in which there are marked signs of cardiac failure is very important. It would seem best that these should be dealt with on the well understood methods of rest and digitalis, and that if thereafter it is deemed well to try to restore the normal rhythm, a period of at least a week should be allowed to elapse before the quinidine is begun.

In many cases the occurrence of extra-systoles is not noticed by the subjects of them, but they may be associated with feelings described as if a "beat were missed out" or as if the heart were "tumbling over." The amount of discomfort, in some cases amounting to distress, varies greatly; some pay little attention to them, others of a more nervous disposition suffer greatly.

Clearly to recognize that a cardiac irregularity is due to the occurrence of extra-systoles is of course a matter of prime importance. It is sometimes very difficult, and sometimes it is impossible, to be certain without instrumental means.

It is not easy to say anything useful about the prognosis of extra-systoles; in some cases they appear to

be of no importance, but it must be admitted that they are more frequent in those who have cardiac valvular or muscular lesions and in those the subjects of increased blood pressure, that they often persist in spite of treatment, that they may be associated with severe distress, that their very existence may develop a severe neurosis, and that the patient cannot be reassured.

In cases where we find no organic disease of the heart, we shall probably advise as to careful living with a strict avoidance of anything approaching to invalidism. Open-air pursuits should be encouraged and a reasonable amount of exercise should be taken. The diet should be light; mastication should be thorough, and the teeth should receive attention to make this possible, to eliminate oral sepsis, and to guard against flatulence. Coffee should be avoided; tea should be weak and fresh; tobacco should be limited. It is of interest to note that some observers claim to have seen great benefit from the use of small doses of quinidine in extra-systoles and in paroxysmal tachycardia. Fred M. Smith of Chicago is especially confident about this.

In Pulsus Alternans.—Every second beat is weak, and that without the excuse of being premature as in the case of the *pulsus bigeminus*. The prognosis of this is so grave that it is necessary to mention that a short period of alternans may follow on a premature systole without exciting alarm, but if it shows any tendency to persist the outlook at once becomes serious.

When heart-block is partial there may be no irregularity, as when every second auricular stimulus gets through.

When a patient has partial heart-block it may pass off entirely and the A-C interval may in time become normal; on the other hand, it may become complete, and then the patient is usually better in health and more comfortable than when the block was partial; both when the block is partial and when it is complete he is liable to attacks of the Adams-Stokes syndrome, and any one of these may prove fatal.

Dr. Frederick W. Price, M.D., F.R.S. (Edin.), regards extra-systoles as of great practical importance; they constitute one of the most frequent causes of irregularity of the pulse and may give rise to very disagreeable sensations. It should be remembered that while they are of more frequent occurrence in the middle-aged and elderly, they may be met with in the young.

The prognosis of extra-systoles is of great practical importance, and there is considerable diversity of opinion on this question. While it may be granted that extra-systoles are of more common occurrence in the subjects of organic heart disease than in those who are not, and are more frequent in myocardial degeneration than in valvular disease, further experience has not led Dr. Price to change the opinion he expressed in 1911—namely, that when extra-systoles are considered by themselves (that is, without reference to the conditions with which they may be associated) there is so far no evidence for supposing that they are either indicative of an impaired heart or that they add to the gravity of any existing morbid condition.

With regard to treatment; this should be directed in the first instance to the causal or associated condition, the general health, and any existing cardiac failure, if present. He had never found digitalis or quinidine of any value for the irregularity itself. Bromides are frequently of benefit for the associated subjective symptoms, especially when there is irritability of the nervous system or insomnia.

The Diabetes Problem of To-Day.

By ELLIOT P. JOSLIN, M.D., Boston.

Jour. American Med. Assoc., September 6, 1924.

FEWER cases of diabetes are appearing in the United States of America than formerly in young persons. The Jew is prone to diabetes not because he is a Jew,

but because he is fat. This is proved from life insurance statistics. Insulin has turned out to be more useful than was expected a year ago.

Many patients have been able to leave off insulin, probably partly because they pay more attention to their diet while using it. One great feature of insulin is the attention it directs to the all important question of diet. Possibly regeneration of the cells of Langerhans occurs in some cases. The duration of life in severe cases was much prolonged, but neglect of precautions is often fatal, especially as persons on insulin are tempted to use too liberal a diet.

Hyper-insulism.

By SEALE HARRIS, M.D., Birmingham, Ala.

Jour. American Med. Assoc., September 6, 1924.

DIABETES is a condition in which there is hyperinsulism with excess of blood sugar. Harris believes that some people suffer from hyper-insulism with defect of blood sugar, the symptoms being hunger, weakness and anxiety neuroses.

In some persons with these symptoms the blood sugar was found to be low, e.g., 0.065. After taking food five times daily, he has kept such patients quite free from symptoms for a year.

Sometimes the condition is associated with a lowered glucose tolerance.

In starvation this condition does not occur, the blood sugar being normal even with extreme emaciation.

The Use of Tryparsamide in the Treatment of General Paralysis.

By F. G. EBAUGH, M.D.,

and

R. W. DICKSON, M.D., Philadelphia.

Jl. American Med. Assoc., 13th September 1924, p. 803.

"Most syphilographers and clinicians have agreed that a new therapeutic approach is desirable in combating neurosyphilis, since the usual arsenicals and other drugs directed primarily from the spirocheticidal point of view are frequently ineffectual, owing to lack of penetrability of the central nervous system."

During the year 1922, 250 patients with general paralysis, fifty-two of whom were women, were admitted to the Philadelphia General Hospital psychopathic wards. In 1923, 218 patients, sixty-seven of whom were women, were admitted. This abundant material often represented failures of treatment, in that many of these patients had received the usual anti-syphilitic treatment in the hands of private physicians or in outpatient clinics. We may for practical purposes divide this large group of material into three main classes.

A. *The Organic Group.*—Parenchymatous neurosyphilis in which the destruction of the central nervous system has proceeded beyond repair. These patients showed definite mental deterioration. Eleven patients of this type were treated.

B. *Organic Reaction with Psychoses of Functional Coloring.*—General paralysis in which therapy may possibly arrest the pathological processes and restore the patient for either transient or permanent periods. Clinically, this group includes the psychoses simulating the functional disturbances seen in maniac excitations with expansive delusions; in the depressions, and in other reaction types, in addition to the organic syndrome present in general paralysis.

The use of tryparsamide in the thirty-six cases of this type treated was of great interest and clinical import, as many of the patients had previously received arsphenamin treatment without success.

C. Transitory Psychoses Without Signs of Deterioration.—General paralysis in which the mental symptoms are frequently transitory and are exhibited before any signs of deterioration develop. In this group occur the delirious reactions and neurologically irritative phenomena, as seen in convulsive seizures, aphasic attacks and meningovascular and endarteritic upsets. Such patients are so few that their admission to the psychopathic ward was a rare occurrence. However, a small number of patients were admitted showing delirious reactions. Five cases were chosen for treatment.

Tryparsamide was given intravenously in weekly doses of 3 gm. (in a solution in 10 c.c. of sterile distilled water) over a period of ten weeks. A rest period of eight weeks was instituted after each course of ten injections. Careful preliminary ophthalmological studies were made in each case, and optic atrophy of any degree was ruled out. Routine laboratory studies, including blood-chemistry and urine, were normal in each case. A weight chart was kept of each patient, as well as frequent progress notes regarding clinical and serological changes following treatment.

Although mercuric salicylate was given in the first ten cases, this was discontinued owing to complaints from the patient concerning the pain of injection. At any rate, for the purposes of the investigation, it seemed advisable not to use both drugs in treatment in order that definite data could be obtained concerning the value of tryparsamide.

The authors define improvement in this group to mean that the patients have been discharged from the psychopathic wards and are working regularly and are supporting themselves or their families.

Summary of cases.

| General Paralysis. | Number treated. | Number improved. |
|---|-----------------|------------------|
| Group A. Deteriorated cases | .. 11 | 0 |
| Group B. Organic psychoses with functional coloring | .. 36 | 10 |
| Group C. Transitory psychoses | .. 5 | 5 |
| Total | .. 52 | 15 |

The serological results were interesting in that in all cases the cell count and the globulin fell within normal limits following the first course of injections. The gold curve tended to show less precipitation. The spinal fluid Wassermann reaction, however, remained unaltered in nearly every case.

There was a marked improvement in the physical condition of the entire group of patients treated. In two-thirds of these cases, this consisted in a definite gain in weight, and an increased hematopoiesis as shown in increased hemoglobin and red blood cell counts.

Unfavorable effects of tryparsamide.

In the treatment of these patients, approximately 1,000 intravenous injections have been made, and the unfavourable results summarized as follows:

1. Jaundice developing after injections in two cases.
2. Dermatitis in one case.
3. Visual disturbances.
4. The serious question of neuro-relapse.

The jaundice in the two cases occurred during the second course of injections. In one case it was mild, and after two weeks' rest treatment was again instituted with no bad results. In another case it was very severe, with definite evidence of impairment of liver function.

The dermatitis, in contrast to that seen after arsphenamin therapy, was certainly mild, and the patient has now completed a course of tryparsamide with no returns of her skin condition. This finding is therefore of little clinical import.

Since tryparsamide has a selective affect for the optic tract and can never be used with any degree of optic atrophy, its universal use in general paralysis has been seriously impaired. To the authors' surprise, routine ophthalmological consultations have ruled out the therapeutic use of this drug in nearly one-third of the cases selected for treatment. This was discouraging, since these patients frequently were considered otherwise favourable for treatment after complete clinical and serological examinations.

The fact that out of the fifty-two patients treated fifteen are now working is most gratifying, especially as eleven of the fifty-two cases were deteriorated.

The question of neuro-relapse impresses the authors as being a very important one, and they certainly do not wish to duplicate their recent experiences with two of the patients treated. However, as in arsphenamin therapy, the patients in whom these upsets occurred responded to further treatment. The frequency of reactions of this type in the further use of tryparsamide will prove of extreme clinical importance. One should not speak of a cure in neurosyphilis, and therapy is directed more to arrest this disease before mental deterioration has developed.

At present, they definitely conclude that tryparsamide gives evidence of being the best drug so far advanced in the treatment of general paralysis. They do not feel that a general release of this drug should be made now, since many physicians would begin to use it in primary and secondary types of syphilis, in which it would prove to be valueless.

Report of the Third Session of the Health Committee of the League of Nations.

THE Committee sat at Geneva from September 27th to October 4th, 1924, and was attended by delegates from all nations excepting Russia. India was not directly represented, her interests being looked after by the British delegate, Sir George Buchanan.

Of matters interesting to us in India, the Health Committee approved the preparatory work for the opening of an Epidemiological Intelligence Office at Singapore, and notably, the summoning of a conference of the health officials of Eastern countries to be held at Singapore this year. The object of this office is to quicken and improve the interchange of information regarding epidemic diseases between Eastern countries.

The Health Committee approved the report of a sub-committee on opium. This report was asked for by the Preparatory Committee of the International Opium Conference. The sub-committee stated that the legitimate requirements of European populations might be taken as 450 milligrammes of raw opium and 7 milligrammes of cocaine per head per year. The Health Committee further agreed that it was doubtful if the therapeutic value of heroin was sufficient to justify its manufacture in view of the abuse this drug is put to.

Another sub-committee had been at work studying the possibility of disinfecting skins and hides against anthrax. No economical and certain method has yet been devised which is not detrimental to the material. The matter is one of great importance to India as the International Labour Office are keeping a sharp eye on the Indian hide trade.

Reports of the various commissions at work under the auspices of the League of Nations were received and discussed; notably the malaria commission now at work in Europe, the anti-tuberculosis and sleeping sickness commissions now at work in equatorial Africa.

Finally, the Committee decided to continue the interchange of personnel between nations and to finance the scheme for 1925. Under this scheme health officials of one nation have brief visits of study to other countries.

As can be seen from the minutes of this third session, the Health Organisation of the League of Nations is

a live and active body supported by ample funds. It is unfortunate that it is not yet possible to amalgamate it with the old established Office Internationale d'Hygiène Publique as the functions of the two bodies are identical, but until the League of Nations is firmly established as the leading international court it will not be possible to do without the "Office."

Radiotherapeutics in Dermatology.

British Med. Jl., 20th September 1924, p. 512.

In the section of dermatology of the British Medical Association meeting there was a discussion on radiotherapeutics in dermatology. The opening paper was by Dr. J. H. Sequeira. He recorded several types of dermatosis for which he found *x*-ray therapy of value:—

(1) *For the relief of Itching and in Pruriginous Skin Diseases.*—Pruritus ani and pruritus vulvæ in which no local cause can be discovered are frequently relieved by occasional exposures. As a rule benefit is manifest after the first sitting, and if there is not speedy relief it is unwise to persist with the rays. Eczematous lesions, often due to scratching, in which conditions are benefited not only by relieving the pruritus, but by the local action of the rays. In all cases he allows an interval of three weeks between successive exposures.

(2) *In Psoriasis and Chronic Seborrhoides.*—Where the eruption in psoriasis is limited an occasional *x*-ray treatment is of great value. The lesions rapidly disappear, but the tendency to relapse is not removed. In some forms of seborrhœic dermatitis the *x*-rays have a rapidly beneficial effect: moist lesions dry up, scaly lesions disappear. Where the scalp is badly affected the depilatory action of the rays may be used with advantage, the removal of the hair permitting more thorough treatment by topical remedies.

Tuberculosis.—The first cutaneous disease treated by the *x*-rays was lupus vulgaris, and though no one can deny that the results are beneficial in certain types of case, much harm has been done in others. In the ulcerative form and in the closely allied condition, scrofuloderma due to infection of the skin by the breaking down of tuberculous foci in glands, bones, and joints, the *x*-rays are of great service. A few applications at intervals produce a rapid healing of the ulceration and the disappearance of gumma-like swellings. After the ulcers have healed it is common to find isolated dry nodules in the cicatrix, and these require treatment on the same lines as dry lupus. In dry lupus the nodules are yellowish-brown spots of translucent jelly-like appearance, embedded in the skin. There may be a thickening of the horny layer over these nodules. This type can only be removed by the *x*-rays by pushing the treatment to an actual dermatitis, and after treatment pushed to this extreme, or repetition of the *x*-ray applications over several years (a not uncommon thing), we meet with the tragedy of lupus carcinoma.

Granulomata.—Granuloma (mycosis) fungoides was first treated by the *x*-rays by the late Dr. Allan Jamieson. There is no other condition in which such striking results are obtained. Large mycotic tumours disappear in a remarkable manner, areas of infiltrated skin become soft and supple, and the intolerable itching is allayed. Unfortunately the improvement is only temporary, the infiltration and tumour formation return. By repeated treatments the patient's life is prolonged, much suffering is relieved, and we are able to avoid the distress and discomfort produced by septic ulceration of fungating masses, which was usual before the introduction of radiotherapy.

Carcinoma of the Skin.—Many admirable results have been obtained. The earlier diagnosis of rodent ulcer has led to an almost complete disappearance of the grave cases, formerly so common in the clinics. Radium has been used in 1,262 cases, and small rodent ulcers not involving bone or cartilage can usually be cleared up by

three exposures of two hours' duration, to a half-strength radium plate. Where bone is involved the *x*-rays in heavy doses may be used in conjunction with surgery.

Squamous carcinoma does not respond to *x*-ray or radium treatment, and in no case would the author recommend either measure instead of operation.

Appendages of the Skin.

Ringworm of the Scalp and Beard.—The depilatory effect of the *x*-rays led to their use in tinea. Thanks to Sabouraud and Noir's pastille and to the tintometer of Corbett and Dean, and to the exact regulation of distances which we owe to Kienböck and Adamson, the technique for epilation of the scalp in tinea capitis can be carried out with precision. In Dr. Sequeira's clinic 7,143 cases have been treated during the past fourteen years. In only four cases has he been able to trace a partial alopecia, and this may have been due to idiosyncrasy.

There is no risk whatever to the brain, and in a large proportion of cases the hair grows stronger and thicker after the epilation. As a rule no children under 4 years of age are treated. The results in tinea barbæ are equally good. It must be quite understood that the rays do not kill the fungus; they merely bring out the infected hair. It is, however, interesting to note that eczematoid ringworm of the extremities is often benefited by a short exposure to the rays.

In a few early cases of coecogenic sycosis a cure is obtained, but in many cases epilation produced by the *x*-rays produces only a temporary improvement in the condition. Relapses are exceedingly common in the chronic cases. In some instances one is obliged to produce a permanent epilation before a cure is effected. This is often followed by atrophy and a vulnerability of the skin leading to recurrent inflammation, especially on exposure.

Hypertrichosis.—Many dermatologists have used the *x*-rays for the removal of superfluous hair, and at one time an improved technique appeared to give most gratifying results. Unfortunately, in a certain proportion of cases, the removal of the hair permanently has been followed by the appearance of slight atrophy with ugly telangiectases on the radiated skin and on the mucous membrane of the lips.

General Effects.

*Influence of *x*-rays on the Viscera and Blood.*—It is important for the dermatologist using *x*-rays to be aware of the influence of these radiations on certain organs and on the blood. It is generally known that the seminiferous tubes of the testes are exceedingly sensitive, and that sterility, complete or partial, temporary or permanent, may follow exposure of the testes to the rays, especially if repeated. Radium acts similarly. The rays also have an undoubted influence on the thyroid gland, and this fact has been utilized in the treatment of Graves's disease. *X*-rays and radium, especially in cumulative doses, have a marked influence on the blood. Senn was the first to show that an enlarged spleen and glands in leukaemia will diminish under *x*-ray treatment, and the leucocytic count is materially diminished. All workers with the *x*-rays should study Sir Humphry Rolleston's admirable and timely address on acute constitutional symptoms due to radiations. He concludes that these symptoms are probably due to flooding of the circulation with proteins liberated by the destruction of cells.

Phototherapy showed by experiment that the various parts of the spectrum (visible and invisible) have different properties. It was demonstrated by simple experiments that the so-called sunburn is a reaction of the skin to the actinic rays of light. Actinic light has very little penetrative power, and penetration of vascular tissues is very small indeed. By experiment Finsen showed that the red colouring matter of the

blood is an important factor in preventing this penetration. The shorter radiations penetrate less than those of longer amplitude. For therapeutic purposes the greatest penetration is obtained by concentrated sunlight, or, what is more convenient in northern latitudes, concentrated rays from a powerful carbon arc, on a surface rendered anæmic by compression. The heat rays of the sun or arc light must be removed by a cooling apparatus, which is in practice combined with the compressor.

(a) Local Effects on the Skin.

About six hours after the exposure of an area to concentrated arc light for an hour an acute erythema occurs. This is followed by vesication, and the vesicles may take several days to heal.

Lupus Vulgaris.—Finsen therapy is the ideal method of dealing with cases of lupus vulgaris of the dry type, especially where the lesions are situated, as in the majority of cases, on the face, and it is important to obtain a good cosmetic result; from 60 to 70 per cent. of cases of lupus are cured by Finsen therapy—that is, local application of concentrated light alone.

(b) General Effects of Light.

Like the x-rays, the sun's rays and the radiations from a powerful artificial illuminant have a marked influence on the human body generally. Fortunately, there is here to record very little but what is good. The exposure of the whole surface of the body to the sun's rays, as shown by Bernhard and Rollier in the Higher Alps and by Gauvain at Alton and Hayling, is of great therapeutic value in certain forms of tuberculosis.

The exposure of the whole body to light in the light bath produces:

(1) Erythema in the irradiated area. This is usually transitory, and may be followed by desquamation.

(2) Pigmentation. The degree varies with the duration and number of exposures, and with the individual. The source of light also has an influence.

(3) A moderate increase in the body weight, observed in some cases.

(4) A slight increase in the leucocytes was noticed in some patients.

(5) An increase in the bactericidal action of the blood; but in some instances there is no change, and it seems probable that this observation may have a prognostic significance (Colebrook).

(6) Steady improvement and actual healing, without local treatment, of surgical tuberculosis and especially of lupus vulgaris, both of the skin and mucous membranes. In lupus the combination of local light treatment (Finsen therapy) with the light bath gives 90 per cent. of cures. Experience in this respect agrees with that of Reyn and his assistants.

(7) A marked improvement in the general health of the patients, although Dr. Argyll Campbell found no change in the basal metabolism of patients examined.

The only untoward result seen in light bath treatment, whether the illuminant is the sun or an artificial source, is the occasional "flare up" of a tuberculous process, especially where there is pyrexia.

It is wise to begin the treatment of cases of visceral tuberculosis with very short exposures limited to small areas, and to watch carefully the effect on the temperature and other symptoms.

Dr Rupert Hallam (Sheffield) was rather surprised that Dr. Scquerra had not mentioned the value of small doses of x-rays in the treatment of that group of diseases which at one time sheltered under the name of

parasamide. Marked improvement often results, but the authors do not claim cures.

(2) Dr. Stokes and Dr. Schaffer of Rochester report that a course of treatment consisting of (a) arsphenamin intravenously, (b) soluble mercurial salts intramuscularly and (c) sodium iodide intravenously; combined with mercurial inunctions during the periods of rest between the courses of injections, have given excellent results in 90 per cent. of cases of meningeal neuro-syphilis, in 75 per cent. of cerebro-spinal syphilis, in 48 per cent. of tabetic neuro-syphilis, and 39 per cent. of vascular syphilis. In general paralysis these methods gave no permanent benefit.

The arsphenamin course consisted of six doses once weekly (1110 gram for each 25 lbs. of body weight). Mercuric succinimide was given simultaneously for 20 to 30 daily doses. The interim treatment was forty inunctions of 30 to 50 grains, with rest intervals of a month between each set of inunctions. The iodide treatment was 1 to 10 grams of sodium iodide daily for 20 to 30 injections. In some cases the arsphenamin course was intensified by giving the injections twice weekly for 8 weeks, and in some intraspinal arsphenamin-serum was given.

(3) Dr. Nelson Myll (Major, U. S. Medical Corps) combats the view that genito-urinary tuberculosis should be treated surgically. He advocates a course of treatment of at least a year consisting of:—(1) Rest in bed in the open air. (2) Heliotherapy by the Rollier method, the sites of the inflammation where possible receiving direct radiation. Tanning of the exposed part short of burning is to be aimed at. (3) A generous, nutritious diet.

In cases with bladder irritation 5 c.c. of a 5 per cent. solution of calcium chloride was given intravenously every five days.

Abscesses are aspirated or opened and exposed to the light. At the beginning of the treatment there is often a temporary aggravation of the local symptoms, but steady improvement is almost invariable.

The International Public Health Committee of the Bureau International. October, 1924 Session.

The session was held in Paris from the 6th to the 15th October, 1924, and was attended by delegates from some 30 different countries and states. In addition to general business and agenda, the following special questions were discussed.

Plague.—Reports were received from many countries as to the rodent hosts and transmitting fleas responsible for epidemics. In the localised outbreak in East Suffolk in 1909-1910, in addition to rats, two hares, two rabbits and a cat had been found infected. A report received from Algiers on the results of examination of 900,000 rats and their ecto-parasites showed that there were very marked differences in the species most prevalent in different departments, but *Mus decumanus* constituted 74 per cent. of the general rat population, and *Xenopsylla cheopis* was the most prevalent rat flea. In Senegal this flea constituted no less than 95 per cent. of those found on the local rats. In Lisbon, *Ceratophyllus fasciatus* had been incriminated as a plague-transmitting flea in cold climates. Professor Gosio reported that he had found that larvae of the common flies *Musca domestica*, *Calliphora vomitoria* and *Lucilia macellaria*, developing in plague-infected corpses, shewed plague bacilli in abundance in their intestinal tracts, and the infection persisted through pupation into the adult fly. An account was given of the 1920-21 epidemic in Manchuria, responsible for some 8,000 deaths. The tarabagan *Arctomys bobac*, was the rodent responsible, and the epidemic, which commenced as a purely bubonic one, terminated as a purely pulmonary one, with direct transmission via the sputum from man to man. In India the recrudescence

Notes from the Journal of the American Medical Association, 6th December, 1924.

(1) Drs. Wile and Wieder of Michigan report further successes in the treatment of neuro-syphilis by try-

in 1923 in the United Provinces and the Punjab was dealt with, together with the relative immunity enjoyed by Bengal and Assam. In an outbreak in Madagascar 65 per cent. of cases were either of septicæmic or pulmonary type, all of which proved fatal.

All the observations made tended to confirm the view of the unity of the plague virus and to discredit the view that pneumonic plague was due to symbiosis of *Bacillus pestis* with other pulmonary organisms, such as the influenza bacillus.

Scarlet Fever.—Reports received from different countries indicated that there was a steady reduction in mortality of recent years. Thus the Low Countries (Holland and Belgium) reported a diminution in mortality in 30 years from 5.57 per 10,000 inhabitants to 0.78 per 10,000 inhabitants. In Spain the corresponding reduction was from 0.67 in 1900 to 0.22 in 1923. In Japan the disease, once rare, was now not uncommon. In Uruguay there had been extensive and severe epidemics, but mortality tended to be very much reduced of recent years. A report from India stated that the disease was very rare indeed among Indians; it was seen especially among the families of British troops in this country, but was an insignificant disease as far as India is concerned.

Alastrim.—The independent existence of this disease, as one differing from small-pox, was discussed. In Switzerland small-pox appeared of recent years to have undergone considerable loss of virulence, cases tending to be of very benign type. An extensive epidemic of alastrim occurred in the island of San-Miguel in the Azores in 1923-24. The infection was imported from over-seas and spread over the entire island, despite all protective measures. In ten months there were 15,000 cases out of a total population of 126,000 in the island, but with only 10 deaths, three of which occurred in pregnant women. The train of symptoms appeared to exclude small-pox. In general there was slight fever for only two to three days; slight headache and joint pains; vomiting was rare; and the rash appeared as the fever subsided. It was at first papular, then vesicular; then the vesicles became milky in colour, "milk-pox"; whilst the eruption was practically never confluent. It lasted 24 to 48 hours, sometimes several days, after which desiccation was rapid, leaving finally only the very slightest of whitish scars. The size of the vesicles varied from that of a grain of wheat to that of a pea. The face, feet and hands were especially affected, but the patients' general health remained excellent and they were not inconvenienced by the eruption.

In brief the disease appeared to be quite unlike small-pox. Umbilication of the vesicles was very rare; they resembled those of chicken-pox rather, and were dome-shaped. Vaccination was found valuable as a protective measure. In general it might be concluded that small-pox, alastrim, cow-pox and varicella were members of the same family of diseases, but equally stringent prophylactic measures should be taken against all four types of disease.

Leprosy.—A recent census in Italy had brought only 182 cases to light in the 34 provinces, some of which were soldiers returned from Albania, who appeared to have contracted the infection in the trenches there during the war. In the Dutch East Indian colonies leprosy was becoming a serious problem; thus in Surinam there were 1,500 lepers in a population of 130,000. In India the estimated general incidence was some one per cent. Korea had 3,000 to 4,000 lepers. Algiers presented an interesting contrast; during the past 30 years only about a dozen cases had been reported among the indigenous inhabitants, whereas 150 had occurred among the European population, three-quarters of them among Spaniards in the provinces of Valence and d'Alicante.

Goitre.—Propaganda was in progress throughout Switzerland to persuade the population to add 2.5 to 5 mgms. of potassium iodide per kilo. to their kitchen salt in order to control the endemic goitre so prevalent

in the country. No harmful results had occurred from this measure, whilst in cows the addition of potassium iodide to the salt used in feeding appeared to increase their milk output.

Tabes and General Paralysis.—Reports indicated the very varying difference of incidence in different countries and climates, also in European countries diminished virulence of type in recent years,—probably owing to recent improvements in the diagnosis and treatment of syphilis. In Sweden, however, the incidence of tabes in 1915-1919 was definitely higher than in 1910-1914, or for any previous period within the past 60 years.

Sleeping Sickness.—During the past 20 years sleeping sickness has invaded the Portuguese islands of San Thome and du'Prince, and also Angola and Mozambique on the mainland. In the Cameroons the French have now a full and very efficient organisation to combat the disease, and progressive diminution in incidence is reported month by month.

Rhinoscleroma was reported as prevalent in certain areas in Poland, especially in the south and east. In Galicia it had long been known, three different foci being recognised, one in the east, a second around Lwow, and the third in western Galicia. The age incidence was between 15 and 50 years, and 59 per cent. of the cases were among industrial workers.

Among many other projects in which the Committee were interested were such questions as the distribution of typhus and relapsing fever in India; the climatic and racial incidence of cancer; the mutations of the tubercle bacillus with special reference to prophylactic antigens; pulmonary tuberculosis in Cochin-china and Indo-china; and prophylaxis against kala-azar.

The Public Health Commissioner with the Government of India, in forwarding the report of the Bureau, writes that every attempt is being made to make the connection between India and the Bureau closer, and a delegate or delegates specially representing India and in close contact with the present public health problems of India will be appointed.

Sea-Sickness.

In the *British Medical Journal* of the 13th December, 1924, Dr. A. P. Bertwistle, M.B., Ch.B., F.R.C.S. (Ed.), advocates the following prescription for this distressing malady; Sodii bicarb. grs. xv.; tinct. gentian m.xx.; spir. chlorof. m.xx.; aquam ad oz. one half; one tablespoonful every four hours or more often. It is claimed that beneficial and even dramatic results ensue. The mixture is tolerated even when the patient is actually sick; if vomited it serves to wash out the stomach; and it is perfectly harmless, which can hardly be said of chloral if pushed to the point of somnolence.

The Sex Ratio among the Chinese.

As is well known, Great Britain is faced with the problem of what to do with her one and a quarter million surplus females, and various remedies, from polygamy to emigration, have been suggested. In an exceedingly interesting lecture before the China Society of Science and Arts, Dr. F. Oppenheim has shewn that exactly reverse conditions exist in China; (*The China Journal of Science and Arts*, September, 1924, p. 466). In England for the period 1906 to 1915 male to female births were as 103.9 to 100; but an excess of male deaths occurs during the first year of life, 124.3 male infants dying as against 100 female infants. For this excess male mortality he adduces an interesting reason. It has been shewn by Morgan, Stevens, Wilson and others that sex is determined by the presence or absence of an additional chromosome in the spermatozoon. The female is homozygous, and in the ovum there is no additional chromosome; in other words, the female

produces only one kind of germ cell. The male, on the other hand, is heterozygous, and produces two kinds of germ cells, one with, the other without, the additional chromosome. If pairing of ovum and spermatozoon results in the presence of the additional chromosome, the offspring is female; if not, the offspring is a male. Further, as hereditary characters are transmitted through the female only and not through the male, as in the well known instances of hæmophilia and colour-blindness, inherently lethal factors are probably thus transmitted and manifest themselves in the male child, who thus shews a greater tendency to die than does the female; in the female offspring such factors are probably compensated for by the presence of the additional chromosome, and the inherent lethal factors do not become manifest in them, but only in their male children. This results in the excess mortality among males as compared with female infants, and in most European countries in an excess of females among the adult population.

In Germany, since the war terminated, there has been a marked rise in male births, the proportion of male to every 100 female births having risen steadily from 106.2 in 1914 to 107.7 in 1918, and 107.8 in 1921,—the latest figure quoted by the author; who discusses the reasons for this well known post-war phenomenon, and concludes that it is due to the conditions of mal-nutrition following upon the close of the war.

It is interesting to note that, when general infant mortality is high—as in a hot summer, from infant diarrhoea,—the curve of infant male mortality is the inverse of the general infant mortality; males are not especially affected; and such factors as are responsible for the excess male infant mortality in general are not external or climatic factors; but inherent and inherited ones.

Turning to conditions in China, the author first records the result of an investigation of living brothers and sisters of 473 adolescent Chinese students. The results were to show 115.6 males as against 100 females. Further, the curious fact appeared that in China infant mortality is in excess among females, and not males. (The author does not discuss the possibility of female infanticide as an explanation of this, but—in view of the disclosures in the recent census of India—we consider that such a possibility in China would be worth investigation.) The female infant mortality was 38.1 per cent. as against a rate of 32.6 per cent for males. Similar findings are recorded from an investigation of 1,000 Chinese mothers in Peking by Dr. Gray, and of 4,000 fathers by Dr. Lennox in Peking. On the other hand, among the Chinese in Singapore, where females are relatively few and economic conditions good, the female death rate, 2.9 per cent., is lower than the male death rate, 3.8 per cent.

"If we now summarise the results," concludes Dr. Oppenheim, "we find two very interesting facts; firstly, the excess of male births is greater in China than in any other country of the world where statistics exist; secondly, this excess of males even increases during the childhood period, because the death rate of the girls in China is higher than that of the boys." Thus China presents an interesting and unique contrast to the rest of the world. At the matrimonial age there are 125.6 bachelors to every 100 spinsters, and apparently one male in every five has no chance of marriage. Where does this surplus male population go? The reply is that it emigrates to the Straits Settlements, the Dutch East Indies, the Philippine Islands and Siberia; where, under good economic conditions and with a paucity of females accompanying it, conditions are reversed and come to resemble those of Europe.

A Chemical Basis for the Treatment of Tuberculosis.

In the *American Review of Tuberculosis* for August, 1924, Drs. Louise G. Robinovitch and G. W. Stiles, Jr.,

record encouraging results in the study of this subject. The dominating fact which makes the tubercle bacillus so resistant to treatment is its waxy or fatty envelope, an envelope which, according to Wells, de Witt and Long is not truly fatty but is for the most part an ester or mixture of esters of the group of waxes. In reviewing the literature to date in 1923 the same authors conclude that "no specific chemotherapeutic agent has yet been found for tuberculosis."

Dr. Robinovitch commenced the present series of studies in 1921; investigating first the value or otherwise of radio-active salts such as thorium hydroxide and nitrate, and later oxygen, but with negative results, although ozone or activated oxygen gave some promise of proving useful. The tubercle bacillus grows best in an acid medium, whereas an alkaline medium appears to be unfavourable to it. Steapsin or lipase, alkalinised and mixed with a strong co-hydrolyzer of wax, was found to decorticate the bacillus; whilst an insulin mixture, similar to the lipase mixture, also decorticated it. It seems possible therefore to devise therapeutic measures in which tubercle bacilli in the body might be rendered susceptible to the destructive action of steapsin or insulin, and further experiments on these lines with ozone and activated oxygen, obtained from calcium hypochlorite, are in progress. Also experiments are under way in which tubercle bacilli, subjected to the decortivating action of steapsin and insulin, with chloroform as a co-hydrolyzer, are being tested for their antigenic properties.

The Diagnosis of Cancer.

Jour. American Med. Assoc., January 3rd, 1925.

DR. JAMES EWING, Professor of Pathology of the Cornell University Medical College, has an article on this subject which is well worth study both by pathologists and clinicians.

He insists that a mere microscopical examination of the tissues is not enough, especially if the rapid frozen section method is adopted. Not merely full clinical details of the case are needed; the pathologist, if his report is to be of value, must have an opportunity of examining the patient in collaboration with the surgeon. "Having made more errors by the frozen section method in breast cases than by the gross examination, I have not resorted to frozen sections in this field for many years, but rely entirely on gross inspection of the breast tissue."

It is refreshing to find such candour on the part of a highly experienced pathologist and this confession should be taken to heart by the surgeon who too often takes refuge in the supposed infallibility of the pathological report.

Many pathologists who read this illuminating article will feel in the same frame of mind as the successful barber surgeon who had had many years of success in cutting for stone and who was dismayed when he saw for the first time a demonstration of the blood vessels of the parts through which he was accustomed to cut with supreme indifference. The diagnosis of malignancy is a subject of great difficulty demanding special study and vast experience such as few have the opportunity of acquiring. In the meantime it is essential that the clinical features of the disease should be studied with the greatest care and that due importance should be attached to them before a judgment is formed.

The Management of Exophthalmic Goitre.

By J. MARION READ, M.D., San Francisco.

Jl. American Med. Assoc.,
December 20th, 1924, p. 1963.

EXOPHTHALMIC goitre is a disease whose aetiology is as yet unknown. This fact renders impossible the

prosecution of rational therapy and forces us to the employment of empirical methods. It is essential to recognize that exophthalmic goitre runs a fairly definite course and in the majority of cases results in spontaneous cure. Failure to recognize this fundamental principle has led to great confusion and uncertainty in the minds of most physicians as to the proper course to follow. Some of the predisposing and exciting factors seem fairly well established. First of these is heredity. The exciting causes may be grouped under three heads:—sex epochs, psychic trauma, and infection, with its drain on the protective mechanism.

The term hyper-thyroidism has become more firmly entrenched since the recent developments in basal metabolism. Unfortunately, it has become the custom to express the basal metabolic rate in percentage variations above or below a supposed normal instead of using absolute values, as has always been done, for example, in recording body temperature.

Failure to secure uniformly satisfactory results with methods based on this theory, together with an increasing number of clinical and experimental facts that defy interpretation on this basis, has cast much doubt on the validity of the "hyperthyroidism theory." The taboo against iodine, instituted by Kocher and fostered chiefly by the proponents of the hyper-thyroidism theory, has been lifted, and a useful drug, whose limitations we should soon know, finds its place in the treatment of exophthalmic goitre.

The very best surgical results, until very recently, show a mortality of 4 per cent. which is no greater than obtains with any surgical operation of equal severity, but is still twice the natural mortality rate of this disease. An excellent check on the natural mortality rate has recently been afforded by the investigations carried on at the Mount Sinai Hospital in New York, in which fifty patients were treated with no specific measures other than small doses of syrup of ferrous iodide administered in some cases. The mortality rate from exophthalmic goitre in these cases was 4 per cent. The number cured and improved compared favourably with the best results of surgical treatment.

These observations are of tremendous significance from a therapeutic point of view, for they establish the fact that with moderate rest in bed small doses of iodine and symptomatic treatment there is a strong tendency toward spontaneous cure. Exophthalmic goitre tends to run a fairly definite course which it is difficult to shorten appreciably by any known means, including surgery and Roentgen rays.

Exophthalmic goitre represents a physiological or functional disturbance in which both the endocrine and autonomic nervous systems participate. The thyroid function is only one of many that are deranged. All this evidence seems to indicate that this disease is not one of the thyroid *sui generis*, as neither gross nor microscopic changes in that gland are constantly present. For this reason measures directed toward the thyroid alone can only result beneficially in so far as the thyroid participates in the disease. For this reason neither surgery nor Roentgen ray exposures of the thyroid can be regarded as curative. That these measures do not fulfil our hopes is evidenced by the facts, if one tries to judge them in an impartial light.

All this might imply a fatalistic point of view in which therapeutic nihilism figures prominently. But such is not the case, as will presently be shown, for there is much that can be done for these patients.

Rest in bed is necessary when the patient first comes under observation, in order to obtain approximately basal conditions on which a satisfactory estimate of the severity of the disease may be made. The amount of rest should vary directly with the severity of the disease, as measured by the toxic manifestations and basal metabolic rate. In severe cases the weakness is such as to enforce rest in bed. As the patient improves,

more and more activity may be allowed, as these patients are restless and feel better if allowed to do something.

More important than rest in bed is avoidance of mental stress and strain, such as is occasioned by worry and responsibility. In this connection we should stress the necessity of relieving constipation with its intoxication. McCarrison's theories on the ætiology of exophthalmic goitre are interesting in this connection.

Loss of weight is a prominent feature, which is not difficult to prevent under proper management. Most patients have a good appetite; in fact in some it is insatiable. As a rule weight is regained when some attention is given to the patient. The aim should be to maintain the normal weight of the individual or the standard weight for the patient's height.

One of the symptoms most frequently complained of and the one most distressing to the patient is palpitation. The most useful drugs in this connection are quinine hydrobromide or quinidine.

The danger of serious and permanent cardiac damage is often used as a reason for early and radical surgical intervention, but full knowledge of all the facts will probably show that the danger is much exaggerated. With the growing tendency to view this disease as representing probably a qualitative change in the thyroid secretion, the giving of iodine has become more popular.

The response varies in different individuals and a few do not tolerate it, while others show marked improvement. The beneficial results will be manifested by early abatement of those symptoms which may be interpreted as due to toxæmia. Decrease in the pulse rate is usually the first objective sign. Subsidence of tremor and a subjective feeling of well-being are often noted, together with a drop in the basal metabolic rate.

Compound solution of iodine is recommended by the Mayo workers. Potassium iodide may also be used. If compound solution of iodine is used, from 3 to 5 drops a day should be the initial dose to test the individual's tolerance. This may then be increased to from 10 to 12 drops daily. Roentgen ray irradiation should be tried in most cases of exophthalmic goitre, as it seems to reduce the toxicity, and in skilled hands is without danger.

The period of treatment varies with the severity of the disease and should be persisted in from four to six months, with monthly estimation of the basal metabolic rate. The half-hearted pursuit of this method has led to its incorrect evaluation by the profession and to unsatisfactory results to the patient. In more than fifty cases treated at St. Luke's Hospital in the last three years, there have been no deaths from Roentgen ray irradiation alone. While no myxœdemas have resulted from Roentgen ray irradiation alone, three have occurred in patients who have been operated on after Roentgen ray irradiation had been started.

Surgery must be resorted to in cases of mechanical obstruction, such as substernal thyroid participating in the exophthalmic goitre and severely toxic cases that show little or no improvement after from four to six months' trial with other measures.

Quinidine in Cardiac Disease.

AN editorial in the *Therapeutic Gazette* of January 15th, 1925, deals with this subject. The following is an extract from the article:—

About a year ago the Cardiac Club of Edinburgh decided, after a discussion of the value of quinidine for fibrillation, to make a collective investigation concerning its usefulness, and in a recent issue of the *Lancet* Hay has combined the reports which were sent in. There were 166 patients suffering from auricular fibrillation and valvular disease of the heart, and 87 patients with the same condition but no valvular disease. Naturally, amongst these individuals there

were cases of arterio-sclerosis and myocardial degeneration, high blood pressure, and syphilitic infection, with or without valvular lesion. There were also 12 thyrotoxic cases. One of the difficulties met with by Hay was the proper classification of the patients, partly because the method of administration of the quinidine varied so greatly; thus one practitioner gave 5 grains three times a day, increasing to 7 and later to 10. Others, on the other hand, gave the same dose five times a day or 25 grains in four days, and gave digitalis first to slow the heart, or gave it concurrently with the quinidine. Naturally it is difficult to compare cases having such variance in treatment.

So too, there was a lack of uniformity in treatment after the resumption of sinus rhythm. Some of the reporters followed the method of gradually reducing the dose of quinidine, and others stopped it at once as soon as fibrillation was arrested. Still others reported upon the liability to relapse, finding that even massive doses failed to prevent recurrence. Taking it all in all, the general opinion seems to be that quinidine should be continued for some time after normal rhythm is restored. The cases furthermore could be divided into those in which there was complete failure, others in which there was temporary success, and others in which the results were permanent in the sense that normal rhythm was restored up to the date at which the report was made. It failed completely in 109, succeeded temporarily in 67, which means 176 ultimate failures, and was a permanent success in 89.

Passing on to a consideration of the safety of quinidine, Hay and his co-workers well recognize its dangers. Amongst the 286 patients, headache, nausea, vomiting, diarrhoea, abdominal pain, dizziness, faintness, buzzing in the ears, general distress, a sense of apprehension, palpitation, precordial pain, excessive ventricular rate, orthopnea, sweating, toxic erythema and urticaria all took place. Manifestly, therefore, a fairly high percentage of patients presented symptoms which more or less contra-indicate the drug. Out of this number of 286, eight died suddenly, embolus occurring in seven of the eight. In the remaining case the death was apparently due to another cause.

Hay asks the questions, after giving details of other patients who had very disagreeable symptoms: how far are patients benefited by the resumption of normal rhythm? And in which particular type of case should quinidine be exhibited? Or, in other words, when is it worth while? The reply to these questions is that it is most likely to be of service when the fibrillation is of recent development and when there is but little cardiac enlargement and no valvular disease. Again, it does best in a patient in whom the onset of fibrillation was due to some acute infection, as influenza. "Each case must be considered on its merits; often the results are far better and more permanent than was to be expected. More frequently, however, they are disappointing."

The conditions which are unsuitable for quinidine, or in which but little good can be expected to result, are the presence of marked myocardial degeneration with old valvular lesions, and particularly if there is complete failure of compensation with venous engorgement. Here digitalis is the best drug. He also thinks that occasionally in a patient who has suffered severely from angina pectoris followed by fibrillation, quinidine may restore normal rhythm. Idiosyncrasy to the drug may induce unpleasant or even dangerous consequences.

Very definite contra-indications are old cases of acute or sub-acute infective endocarditis, or a history of embolism having occurred in some part of the body. It does not, therefore, follow that because quinidine restores a normal rhythm the patient is going to materially improve. The consciousness of irregularity may disappear, but the actual progress of the patient may not be any more favourable.

To summarize the matter, therefore, the average physician, we think, should never employ quinidine off-

hand; he should use it with great caution as to his early doses, and certainly in the majority of instances should not employ it unless the patient is under absolute control and there is an opportunity before and after it is tried to determine the cardiac condition by use of the electrocardiograph.

Whether resort be had to full doses of digitalis or quinidine, an essential part of the treatment is rest in bed.

"Peracrina" in Malaria.

We have received several notices dealing with a new drug, "Peracrina," in the treatment of malaria.

Dr. J. Walker writes at length of this drug in the *Archives für Schiffs und Tropen-Hygiene*, 1924, pp. 540 to 570. Some of the temperature charts therein shewn, however, might well be employed to shew the natural course of untreated malaria, as irregular fever with parasites continuing in peripheral blood films for several weeks, in spite of the treatment. In several others "Peracrina" had no obvious effect, whereas quinine caused a prompt fall in the temperature and the disappearance of the parasites.

It is somewhat surprising that great claims are made for the drug in the face of so strong evidence of its inefficiency.

"Peracrina, 303" is said to be a combination of egg-albumin and trypaflavin.

Reviews.

TEXT-BOOK OF PATHOLOGY.—By Robert Muir, M.D., F.R.S., Professor of Pathology, University of Glasgow. Edward Arnold & Co., London, 1924. Pp. 774. Illustrations 433. Price 35s. net.

THIS book is written on the orthodox lines which are followed by almost all writers of text-books of pathology. It is likely to be adopted as a standard text-book for students as it satisfies the needs of examining bodies more completely than any work that we know. It attains to a very high degree of excellence in the illustrations, text and general get up.

It is not the students' text-book of pathology of our dreams; this would present a far smaller amount of information to the student, and from the orthodox point of view would be very incomplete. Only after such an elementary book had been mastered would we allow the student to tackle so complete and systematic an account of pathology as is presented by Dr. Muir.

The medical student of to-day has to learn so much that his brain becomes highly specialised in the assimilation of information, with the result that his powers of observation and his judgment suffer. The process of addition to the knowledge that is required of the student is ruthlessly continued, but the human brain does not increase in efficiency in a proportional degree. In our opinion the present text-book is far too complete, but we predict that its high standard of excellence will result in its wide-spread adoption.

No harm would be done if only a modern Huxley would arise who would give the student a picture of pathology painted with a few bold strokes and leaving the details to be filled in after the broad outlines had been mastered.

Our criticism of the book in short is that it is a complete and thorough exposition of the subject of pathology for the average student.

The book deals with the material which is usually classified as general and special pathology; such subjects as bacteriology, parasitology, diseases of the skin and special senses are rightly excluded as they are invariably included in the text-books on these subjects.

Dr. Muir's book is certain to attain to a great degree of popularity.

HANDBOOK OF BACTERIOLOGY.—By J. W. Bigger, M.D. (Dublin), F.R.C.P.I., D.P.H., Professor of Bacteriology, University of Dublin. London: Baillière, Tindall & Cox, 1925. Pp. xv plus 413, with 5 colour plates and 66 figures. Price 12s. 6d. net.

THIS is a small book, designed for students and practitioners of medicine and dedicated to the memory of A. C. O'Sullivan, Professor of Pathology, University of Dublin, who died on February 18th, 1924, as a result of an infection of the hand contracted when demonstrating post-mortem specimens to a class.

The author, as a teacher of experience, has realised the formidability of the medical curriculum, in which the ground to be covered in each subject has been increasing by leaps and bounds. He has accordingly endeavoured to compress within the limits imposed by the factors of time and receptivity the essentials of bacteriology requisite for students of medicine.

The chapters dealing with technique, general and special, have been stripped of diffuse details and yet remain quite adequate.

The descriptions of the various micro-organisms are concise and convey plenty of information for those for whom the book is intended. It is of interest to note at the heads of the several chapters the names of the discoverers of bacteria and the dates of their findings.

In the opinion of the reviewer, it would have been a slight improvement to have headed the paragraphs in the chapters with numbers and indications of their subjects in heavy print as such are aids of considerable value to students.

From the point of view of students of medicine in tropical countries, such a book to which have been added sections dealing with the common animal parasites pathogenic for man would be of much value.

In so far as the author's explanation of its publication is concerned, its appearance is amply justified.

THE CIRCULATORY DISTURBANCES OF THE EXTREMITIES, INCLUDING GANGRENE, VASOMOTOR AND TROPHIC DISORDERS.—By Leo Buerger, M.A., M.D., New York City. 192 Illustrations, five in colours. Published by W. B. Saunders Company, Philadelphia and London, 1924. Pp. 628. Price 42s. net.

THIS book deals almost entirely with those circulatory disturbances which may lead to gangrene of part of a limb. The opening chapters describe the anatomy and physiology of the peripheral circulation and more particularly the functions of the vaso-motor mechanism.

Trophic disorders of the skin are dealt with very briefly and then thrombosis and the various forms of gangrene.

A lengthy description of thrombo-angitis obliterans occupies the next 172 pages. The author is a recognised authority on this rather rare disease and it is due to him that the modern name has entirely superseded the older arteritis obliterans.

Needless to say the subject is described fully in all its aspects, and indeed the whole book seems to be built around a discussion of this disease. Arterio-sclerosis, syphilitic disease of the vessels and the various forms of neurotrophic disorders form the remainder of the book, and in the last chapter we find an excellent description of capillary microscopy and its importance as a diagnostic method. There are 192 excellent illustrations. The book should prove valuable as a work of reference, for there is much in it that will not be found elsewhere.

OPERATIVE SURGERY.—By Warren Stone Blackham, M.D. & Phar. M. (Tulane), M.D. (Columbia), F.A.C.S., formerly Surgeon, Manhattan State Hospital, New York and Instructor in Operative Surgery, College of Physicians and Surgeons, Columbia University, etc. In Six Volumes. Philadelphia & London: W. B. Saunders Co. Vol. III., pp. 1001. Illustrations 1250. Vol. IV, 1924, pp. 842. Illustrations 773. Price 50s. net each.

IN our notice of the first two volumes of this work we commented on its general plan and scope, which limits it entirely to a description of operative technique and disarms criticism of omissions by the statement that only the common operations are dealt with. In our opinion the author would have done better to have given us the benefit of his own personal experience, instead of compiling an encyclopædia of all the methods which have been described and used, many of them of historical interest only. As a work of reference, however, the book is very complete, and though the surgeon will have to make his choice in the light of his own experience, he will rarely fail to find a clear and excellently illustrated account of the available operations. Vol. III deals with operations upon the eye, ear, nose and throat, the upper air passages, neck, thyroid and thymus glands, tongue, breast, thoracic wall and lungs. The wisdom of including such special branches as eye and nose operations in a work on general surgery may well be doubted. There are important omissions in some sections, for instance the technique of skin-grafting the cavity left after operation for chronic mastoid suppuration is not described. The surgeon in search of methods of plastic repair for nasal defects will, however, find no less than 53 operations for partial rhinoplasty described and 18 for total rhinoplasty, from which to take his choice. Each of these descriptions is accompanied by a clear illustration, showing the requisite incisions; we know of no other work so complete, and it would be hard to imagine a nasal defect for which a method of repair could not here be found.

We even find a brief section on the extraction of teeth, in which, in a work hailing from across the Atlantic, we were surprised to find no mention of the method of "surgical" removal of the tooth along with the diseased alveolar process, which has been worked out in the Mayo Clinic. Brophy's method of dealing with a complete cleft of the hard and soft palates by approximation of the superior maxillæ and fixation with silver wire sutures is accorded the first place in the list of operations for this condition, a preference which this operation has never obtained in Europe.

The section on the thyroid is one of the best in the book, the descriptions of the operations are very detailed, and the author departs from his usual custom and gives us some illuminating comments on the applicability of the various methods of excision and resection: we wish he would do so more often.

The sections on thoracic surgery contain an excellent account of the brilliant work of Lilienthal on chronic empyema, but we were surprised to note the omission of such useful procedures as Chevrier's operation for acute empyema and Wilms' and Sauerbruch's operations for chronic tuberculous empyema. The use of positive and negative pressure cabinets for thoracic surgery has now surely disappeared with the arrival of intratracheal anaesthesia.

In Vol. IV, the subject of thoracic surgery is completed and we enter upon abdominal surgery. The sections on hernia are very disappointing, the John Hopkins method of radical cure of inguinal hernia, the use of fascial transplants in dealing with large herniæ, Dujarier's operation for femoral hernia, by opening the inguinal canal and pulling up the sac, and Roux's operation should be described in a work of this size, along with the older operations which are given. Amongst the many methods of suturing the abdominal wall which are illustrated, we find no reference to the use of deep supporting sutures penetrating all layers except the

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peritoneum, which most surgeons employ in addition to the sutures in the various tiers.

The sections dealing with operations on the gastrointestinal canal and with the liver, gall-bladder and bile ducts are exceptionally good and complete, and it is a pleasure to find the author departing so far from his usual rule as to give us a balanced and temperate discussion on the indications for cholecystectomy. The reader will find here recorded all manner of ingenious operations for short circuiting the obstructed bile channels in malignant disease and injury cases, such as he will not find in any other book. It is disappointing to find the use of Murphy's button and other artificial aids to intestinal anastomosis described in detail, as though they were still in use. So, too, with such operations as gastroplication and gastropexy, which are now matters of history for most surgeons. However it is easy to find omissions where the field covered is so vast; and it is pleasant to be able to add that these detract but slightly from the value of a work in which successive volumes continue to maintain the same high standard of excellence.

AIDS TO SURGERY.—By Joseph Cunning, M.B., B.S., F.R.C.S. (Eng.); and C. A. Joll, M.S. (Lond.), F.R.C.S. (Eng.). 5th edition. London: Baillière, Tindall & Cox, 1924. Pp. viii plus 434. Price 4s. 6d. net.

THIS is the fifth edition of this excellent little work and this alone is sufficient proof of its usefulness and popularity. The recent edition rests entirely in the hands of Mr. Cecil A. Joll.

The book comprises a resumé of the whole of general surgery; it is clearly and simply written.

It will serve as an extremely useful source of information for students preparing for examination.

We cordially recommend it, and feel sure that its popularity will be further enhanced.

RATS AND HOW TO DESTROY THEM.—By Mark Howell, F.R.C.S. London: John Bale, Sons and Danielsson, Ltd., 1924. Pp. xiii plus 465. Price 10s. 6d. net.

AN important book designed to rouse the public from its apathy with regard to rats. The great economic loss due to these creatures is stressed and a tally given of diseases in man and animals caused, possibly caused or not caused by the rodent; in this regard it is not generally known that the exaltation of virulence of some of the so-called rat-viruses in the market has seemed to suffice for the affection of man as well as of the rat, while other pathologists recounted are Weil's disease, rat-bite fever, favus, some of the dysenteries, ringworm, distemper, foot-and-mouth disease, horse-influenza, mange, tapeworm, cancer [per (1) tapeworms and (2) cockroaches and *Gongylancina*]. The reviewer however dissents from the author's view of the danger of plague in England: the proof of the pudding has been in the eating and the sporadic nature of the outbreaks there for many generations should have reassured the alarmists;—it surely cannot be contended that the health authorities have brought about this happy result. It has been due only to the displacement of the black rat by the brown rat, and the custom of planting hedgerows, which originated about the time of the Great Plague owing to the scarcity of farm labour. The brown rat, unlike the black, disperses widely over the countryside, during the summer months burrowing in the hedgerows: then only would the rat-flea rate be high enough to produce an epizootic of plague, but no serious results follow because of the wide distribution of the rats. At the onset of winter when the creatures return to their association with man, their flea-rate and other conditions are not suitable to produce an epidemic. Thus it has been shewn that the minor outbreaks of the disease in East Anglia have never become serious and never will be.

The book seems to have been designed to encourage private endeavour,—for those whose recreations are "the normal forms of loafing and dilettantism," country squires, clergymen, poachers,—rather than for the public services: thus there are excellent chapters on dogs and sparrow destruction. Nevertheless what appears to be an admirable organisation for county services is suggested to deal with the problem. Insistence is laid on the necessity of a knowledge of the habits of the rat, of which there is a very good account; while among the methods of ratting discussed mongooses are ruled out, the Rodier system is dismissed as at least impracticable, and the employment of viruses strongly objected to on account of their danger to man.

In spite of the all-round excellence of the book for European conditions, it cannot be entirely recommended for India. Its very appeal to self-help rather than for a Government organisation deprives it of nearly all value to this country. The reviewer could tell of fifteen Indian municipalities which, rather than spend per mensem Rs. 2 per persons 300, refused the offer of a Government organisation and the loan free of charge of a very valuable equipment. (Nemesis came to them the year after.) Rat destruction in India must remain a Government perquisite, and the organisation must be quite a different affair to that designed by the author.

As for the technique suitable for India, Kunhardt and Chitré's valuable work in Poona on rats and how to destroy them has been completely ignored. Their conclusions—based on careful experiments—must take precedence over the author's based on experience, and their incorporation into his book would make it even more valuable.

AN INTERPRETATION OF ANCIENT HINDU MEDICINE.—By Chandra Chakrabarty. Published by Ramchandra Chakrabarty: Calcutta, 1923. Price Rs. 7-8-0. Pp. 599.

THIS book consists of nine sections dealing with anatomy, physiology, pathology, diseases and their diagnosis, diseases and their clinical studies, therapeutics, surgery, dietetics and hygiene, with several sub-sections. The book will be of interest as it deals with the ancient Hindu medicine and western medicine side by side in an elementary way, with the exception of certain chapters which deal only with western medicine. There is no sharp line of demarcation between the two systems in the book and in some places the reader is surprised to find descriptions of indigenous medicines side by side with references to the protozoal organisms of malaria, and dissertations on immunity and the principles of vaccine therapy. It will be interesting to follow the progress of those who believe that scientific modern medicine can be combined with the teachings of the ancient systems. We confess that we cannot see any prospect of a useful harmony being produced. It is only in India that such an attempt has been made, and the process suggests the old saying about "running with the hare and hunting with the hounds." Evidently there are some medical men in India who are so optimistic that they believe in the possibility of doing both things at the same time.

COLLECTED PAPERS OF THE MAYO CLINIC AND THE MAYO FOUNDATION.—By Mrs. M. H. Meilish. Volume xv, papers of 1923, published June, 1924. 1377 pages with 410 illustrations. London and Philadelphia: W. B. Saunders Co., Ltd. Price 63s. net.

THIS constitutes a remarkable record of the work of the numerous specialists belonging to the Mayo Clinic and the Mayo Foundation during the year 1923. There are references to no less than 308 papers by 148 authors, but in the case of 97 of the papers the titles only are given, and others are abstracted, so that it has been possible to include a record of a vast amount of work. The subjects are grouped under special headings, viz., alimentary tract, urogenital organs, ductless glands,

circulatory system, head, trunk and extremities, and miscellaneous.

Dr. William Mayo in his chapter on the splenomegalies deals with the subject from a broad point of view, taking the spleen to be a portion of the reticulo-endothelial system. "The spleen is the most unstable part of this system, and as such undergoes most marked pathologic changes from causes not arising within itself, but resulting from disturbances in other organs, and when once morbid processes are set in action, they tend to become chronic, progress slowly to a terminal condition which is little affected by treatment." This is true only of splenomegalies not due to known protozoal diseases, such as malaria or kala-azar. Surgical treatment is applicable only to the other types of cases. In the chapter on the internist's responsibility in surgical cases certain important factors with regard to the patients have been considered. In the paper on "The Pathologists of the Twentieth Century" the real status of the pathologist in the profession has been dealt with; the author urges a broad outlook and closer approach to the patient. The book is a mine of information and will be very useful for all medical men who are interested in recent developments of medical and surgical work.

DISLOCATIONS AND JOINT-FRACTURES.—By Frederic J. Cotton, A.M., M.D., F.A.C.S. Second edition. Philadelphia and London: W. B. Saunders Co., 1924; Pp. 745. Illustrations 1393. Price 50s. net.

THIS is the second edition of this excellent book and its appearance shows the appreciation it deserves as a standard work on fractures and dislocations.

The book has been brought up to date and new chapters will be found dealing with methods which have emanated from the writer's vast experience gained in the surgery of the great war, as for instance, the fixation of infected compound fractures, disinfection and closure of joints and the use of physiotherapy methods.

The book is well written and profusely illustrated by radiograms and drawings, mostly of cases of which the author has had personal experience. Every type of fracture and dislocation is discussed in detail as regards their causation, diagnosis, treatment, after-treatment and prognosis.

A special chapter is devoted to technique, splints and plaster work, which however, might have been discussed in more detail and better illustrated; but, as the author wisely says, of technique one can learn or teach little in a book, as each fracture is a mechanical problem in itself and cannot be treated by routine methods.

We strongly recommend this work to practitioners as a book of reference in their library, to acquaint them with the types of fractures and dislocations that commonly occur; how to carry out the methods of reduction and the application of apparatus that has proved of value; and to outline after-treatment and prognosis.

FACIAL SURGERY.—By H. P. Picker III, C.B.E., M.D., M.S., late Surgeon in charge of the New Zealand Section, Queen Mary's Hospital, Sidcup. With an Introduction by Sir W. Arbuthnot Lane, Bart., C.B., M.S. Edinburgh: E. & S. Livingstone, 1924. Pp. 162. Price 21s. net.

IN no department of surgery were greater advances made during the war than in the repair of severe facial injuries with loss of tissue. In the early stages of the war these cases were supplied with painted metal masks to fill in the missing portions of the face, a method which was not comfortable for the patient and which involved frequent renewals of the painting, which could only be done by a skilled artist. Thanks mainly to the work done at Queen Mary's Hospital, Sidcup, it became possible to restore almost all such cases by purely surgical means and from the patient's own tissues, an advantage to the sufferer from every point of view. It was obvious that these methods would find a large field of

utility in civilian surgery in the treatment of new growths of the face, lupus, nævi, burns, and congenital and acquired deformities.

In Part I the author, who was in charge of one of the sections at Queen Mary's Hospital, sets forth a brief outline of his technique. The use of pressure skin grafts, epithelial inlays, bone grafts and tube flaps and grafts are described in sufficient detail. The use of the "tube" method of transferring skin from the neck and chest or from the scalp to the face has entirely superseded the old methods described in text-books of cutting flaps from one part of the face to remedy defects in other parts. The latter methods caused much tension and resulted—if successful—in poor mobility of the part, whereas the new methods cause no tension and furnish a perfect functional result. It is to this improvement more than any other that the marvellous results obtained at Sidcup are to be ascribed.

Part II deals with the use of these methods in military surgery. The nose, lips, eyelids, chin, etc., are dealt with seriatim and the author's methods of dealing with each region are described and illustrated by some remarkable photographs.

In Part III, the application of these principles in civil practice is taken up, and this is naturally the most interesting section of the book at the present time. The illustrations of cases show large areas of the face excised for epithelioma or rodent ulcer and replaced by grafts so neatly that hardly any scarring is visible in the photographs. Rhinoplasty is familiar enough in India, but we have never seen such good results obtained as are shown here from the use of tube grafts combined with cartilage grafts; extensive burns would appear also to offer a tempting field to judge from figs. 195 to 198, where a mass of cicatricial tissue binding the chin to the sternum and preventing the patient closing his mouth was replaced by a scalp flap, which supplied a hair-bearing chin and enabled the patient to open and close his mouth.

The author has applied his methods to the treatment of hare-lip and cleft palate with results which appear to be superior to those obtained by the usual methods.

The book is most interesting and valuable to surgeons. It is the first presentation of the subject in a handy form which we have seen, and we commend it to surgeons in India, where we feel that there is a wide field of usefulness for these methods.

THE HUMAN TESTIS AND ITS DISEASES.—By Max Thorek, M.D., Surgeon in Chief, American Hospital; Consulting Surgeon, Cook County Hospital, Chicago, Ill.; President, International Congress of Comparative Pathology, Rome. London: J. B. Lippincott Company, 1924. Pp. 548 with 308 illustrations. Price 38s. net.

THIS is an admirable work on the diseases of the human testis by a clinician whose research work is carefully reviewed in the light of clinical findings.

The ordinary diseases of the testis are adequately described, but the main theme of the book is in the domain of the endocrinology of the male gonad with special reference to testicular transplantation in the human subject. As the result of a very interesting series of experiments, the author comes to the conclusion that "the Leydig's cells are alone responsible for the production of the internal secretion that gives rise to the secondary sex characters, sexual potency and cerebral-eroticising products."

The similarity between the bloods of man and the higher anthropoids, together with hetero-transplants of testis from anthropoids to man and vice versa enabled the author to postulate his dictum that "the practicability of therapeutic transplantation from the higher apes to man is proven beyond any doubt." This contention is proved by the fact that the graft, when removed months after the transplantation, is visible, vascularised, shews but little diminution in size, and when sectioned and stained the Leydig's cells are practically normal.

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Although it is conceded that the human testis is best for transplants, this source of supply is strictly limited, and the fact that the testes of the higher apes can be successfully utilised marks a distinct advance in the scope of this therapy.

Dr. Thorek in his transplantation technique uses the whole testis and epididymis, whether human or anthropoid, exposes the tunica vasculosa by small punctures with an electric cautery, and places the graft into the peri-renal region of the recipient, having previously made a bed for it in this situation and secured hæmorrhage; he concludes by uniting the muscular layers and skin with sutures.

Sepsis is rarely encountered, and persistence of the graft is the rule. A special chapter is devoted to the indications and contra-indications for sex gland transplantation in the male.

The case reports of his own cases and those of others bear eloquent testimony to the undoubted value of this method of therapy in specially selected cases.

Interesting chapters are those which describe the dystrophies, dementia præcox, and the inter-relation of the glands of internal secretion. Dr. Thorek quotes fully the work of Voronoff, Steinaeh, Lydston and other workers in this field. The book is well printed in large type, well bound, and excellently illustrated.

DEVELOPMENTAL ANATOMY; A TEXT-BOOK AND LABORATORY MANUAL OF EMBRYOLOGY.—By Leslie Brainerd Aray, Professor of Anatomy at the North Western University Medical School, Chicago. London and Philadelphia: W. B. Saunders Co., Ltd., 1924. Pp. 433 with 419 illustrations, many in colours. Price 27s. 6d. net.

The modern medical courses demand, rightly enough, a wide knowledge of human embryology, and with a view to meet this demand, Professor Aray has written this extremely useful and practical treatise. The clear and lucid manner in which he has narrated the whole developmental story will, we are sure, make the book interesting reading to those for whom it is intended.

Although fundamentally based on the old Prentiss-Arey text-book, it is essentially new in plan and has been entirely re-written. The various stages in the development have been very clearly and concisely stated, and the book accurately records our knowledge to date on the subject. It contains three sections: the first deals with a comparative study of the early stages of development, both pre-natal and post-natal; the second outlines the origin and differentiation of all the human organs, grouped according to their germ layer derivations; the third section is a laboratory manual for the study of chick and pig embryos, and will be very useful to those who are interested in practical embryology.

We can recommend this excellent manual to medical practitioners as well as to medical students as a sound and complete exposition of the subject.

PHYSIO-THERAPY IN GENERAL PRACTICE AND FOR THE USE OF MASSEUSES.—By E. Bellis Clayton, M.B., B.Ch. (Cantab.), Director of the Physio-Therapeutic Department, King's College Hospital. London: Baillière, Tindall & Cox, 1924. Pp. 174 with 22 plates and figs. Price 10s. 6d. net.

This little book is evidently intended for the use of massessers and gymnastic instructors rather than medical practitioners. The descriptions of the lesions to be treated are worded in simple language, comparatively free from technical terms. After a too-brief introduction on the nature of the treatment dealt with, which might in our opinion be usefully extended to include descriptions and diagrams of the apparatus, electrical and gymnastic, which is used, the author proceeds to give directions for the treatment of most of the common injuries and medical conditions which are likely to be sent for physical treatment. The descriptions of the exercises are brief and clear but their value would, we

think, be much enhanced by a few more illustrations showing the movements in dotted lines. The book will be very useful to those for whom it is intended.

THE EXAMINATION OF WATER AND WATER SUPPLIES.—By J. C. Thresh, D.Sc., M.D., D.P.H., and J. F. Beale, B.A., M.R.C.S., L.R.C.P., D.P.H. London: J. and A. Churchill. 59 illustrations. Third edition, 1925. Pp. 590. Price 25s. net.

THRESH'S "Examination of Water and Water Supplies" has been a standard work of reference for many years to practically every water analyst who can read English. It is no mere compilation of methods. Every description and method of analysis given has been thoroughly tried before adoption, and only those which have proved reliable and trustworthy are included, with such details of description that there is no doubt as to the procedure recommended. The new edition is on the same lines and will be welcomed, not only by analysts but by every one interested in public water supplies. Public water supplies are discussed in all their aspects—the geological source, the examination of the sources, the chemical composition, analyses and their interpretation, and the methods of purification. And every chapter is garnished with the wisdom of ripe experience and acute observation. Difficulties and puzzles are illustrated and explained, and we imagine that there are few situations of difficulty or doubt in which a water analyst or sanitarian could find himself in which he could not find assistance by turning to this book.

In the matter of chemical analysis, it is perhaps striking that there has been no very great fundamental change in the methods of the sanitary analysis of water. The determinations of hydrogen ion concentration and the electrical conductivity are new, but have not given very much more information of a sanitary nature than the older methods. The chapters on chlorination and the excess lime method bring the information on these subjects up to date. Houston's "Reports to the Metropolitan Water Board" have been drawn on to illustrate chlorination, the excess lime method of treatment, the filtrability of water, etc. The excess lime method would seem applicable to many Indian waters, which are loaded with organic impurities—its ability to remove excess organic matter gives it a great advantage over chlorination alone.

The chapters on bacteriological examination present English opinion on the subject and are based largely on Houston's publications. The methods advised for routine use are the total colony count on agar and gelatine, the quantitative examination for typical colon bacilli and the *B. enteritidis sporogenes*. To determine the presence of *B. coli* glucose-bile-salt broth is used: from positive tubes lactose-bile-salt broth is inoculated, and organisms isolated from this are examined for the production of indol and acid and clot in milk. Organisms giving positive results in these media are considered to be *B. coli* of intestinal origin. It is not thought necessary to differentiate these any further; the practical value is said to be negligible. As regards the vexed question of bacteriological standards we quote the following:—

"We think it safe to draw the following inferences:—

1. That a water containing less than 100 bacteria capable of growing on gelatine at 20° C. in 3 days, and with comparatively few bacteria capable of growing on agar at 37° C. in 24 hours, and which gives no indication of the presence of the *B. coli* group in 100 c.c. can be considered of the highest degree of bacterial purity.

2. That a water which contains over 1,000 bacteria capable of growing on gelatine, and say over 100 capable of growing on agar, and which contains the *B. coli* as defined in 5 c.c. or less, is probably contaminated with manurial matter and should not be used for drinking purposes unless a thorough examination of the source has proved that such contamination is impossible."

Between these extremes the water requires a fuller examination and a careful consideration of the result of

chemical analysis, and of the history of the water and its source before a decided opinion can be expressed with regard to its purity and wholesomeness.

Where a public supply usually conforms to the high standard given, even if the *B. coli* is found in 100 c.c. and is absent in 50 c.c. it may be considered satisfactory; if found in a much smaller quantity, say in 10 c.c., then further investigation is necessary.

Private supplies from wells rarely reach a high standard, and provided the M.O.H. ascertains that there is no source of sewage contamination near, the water may be passed provided it is free from *B. coli* in 10 c.c. and the total bacteria are under 1,000 per c.c.

"There is a tendency amongst chemists and bacteriologists who examine waters to report unfavourably on any sample which contains the *B. coli* in 100 c.c. and frequently the action causes a great deal of unnecessary alarm. This is said to be Houston's standard, totally regardless of the fact that he has always asserted that this standard is only tentative and is to be controlled by knowledge of local conditions. No doubt Houston is endeavouring to get the London water supply up to this standard of purity, but, because it frequently fails to reach this high standard, he does not alarm the metropolis every time he discovers *B. coli* in 10 c.c. or 1 c.c. of the water supplied. If he did, we should live in a state of continuous alarm."

These extracts put the case fairly clearly. It is a little disappointing to find no mention of work done in India on the subject, but apparently faecal bacilli behave differently under tropical conditions. This is a standard work and the new edition will readily find its place on our shelves and benches beside the old one, though in our opinion the bacteriological sections are not quite up to the very high standard of the other parts.

A. D. S.

DISEASES OF THE EYE.—By G. E. de Schweinitz, M.D., LL.D., Sc.D. Tenth edition. London and Philadelphia: W. B. Saunders Co., 1924. Pp. 865 with 434 illustrations and 7 colour plates. Price 50s. net.

This excellent text-book, now in its 10th edition, has been subjected to a very careful overhaul since the last edition, and the changes—though in many places small and only consisting in the addition or alteration of a few lines—still bring the book well up to date and greatly enhance its value.

The actual size of the book is only increased by a few pages, but 25 new illustrations have been added, and many of the old ones have been re-drawn and very much improved in reproduction.

The paragraphs dealing with inflammatory conditions of the interior of the eye, e.g. iritis and cyclitis, have been largely re-written and re-arranged, and the whole new outlook on the pathology and diagnosis of diseases of the eye, due to the new work done with the slit lamp, pervades the book.

This edition like its predecessors can be strongly recommended to all serious students of ophthalmology.

W. V. C.

THE PROGRESS BOOK. AN ILLUSTRATED REGISTER OF DEVELOPMENT FROM BIRTH TILL COMING OF AGE.—By J. J. Pilley, Ph.D. Specially printed for Mellin's Food, Ltd., Indian Dept. Ninth edition, 1923. London: Leadenhall Press, Ltd. Pp. 144. Price 2s.; white cloth, 3s.; half calf, 4s. 6d. Obtainable at all Messrs. A. H. Wheeler & Co.'s railway bookstalls throughout India.

This is one of the new, modern and charming books for the expectant and actual mother, which should be popular in every family. "Baby" when grown up, may regard his or her earlier and infantile history as of little interest, but no mother would subscribe to such a heresy. Yet the maternal point of view is innately right; eugenics is not merely a theory, it is an ambi-

tion on the part of every wise pair of modern parents; and this attractive little handbook should prove very popular among parents who wish to record the progress year by year of their children. Successive sections deal with a weight chart up to the 2nd year; important happenings, amongst which the first tooth and the first step naturally loom large; teething; ailments in infancy; mental, educational and religious progress; and a (large) section for individual peculiarities, take a prominent place. Physical progress year by year, from the age of 6 until that of 21, complete the very attractive volume, together with a large blank section for general notes.

That such a delightful book will please parents of the present day, there can be no doubt; it should make a special appeal to both motherhood and fatherhood; should provide a source of both interest and pride. Whether it will appeal to the youngsters on whose ultimate behalf it is got up, is more open to doubt; when they grow up, perhaps shingling will have gone out of fashion, the fox-trot will have been superseded, and present day modes of travel be out of date. On the other hand, if we are ever to have a system of genuine human eugenics,—under which children are born, not by mere chance but under a system of selective and rational breeding, such as we now apply to domestic animals, but have not as yet had the courage to apply to man,—the value of such records will at once become apparent. To-day they may be of merely family interest; to-morrow the nation may come to depend upon such records. At least no modern mother of to-day will expect to rear her infant, without recording the details of "its" progress year by year in some such delightful and charming publication.

MELA MANUAL FOR BIHAR AND ORISSA.—By Lt.-Col. W. C. Rose, I.M.S., Director of Public Health, Bihar and Orissa. Patna: Superintendent, Government Printing, Bihar and Orissa, 1924. Price 4 annas.

This little manual has been prepared with a view to helping local bodies to make suitable sanitary arrangements for the conduct of *melas*. Experience has shewn that the sanitation of *melas* is apt to be neglected, partly because it appears to be nobody's business, partly because it is not known what is required, and it is not realised how very important are such fairs in spreading epidemic diseases, and, above all, cholera. A list of the *melas* and fairs held annually in Bihar and Orissa is followed by a chapter dealing with the responsibilities of the local bodies within whose jurisdiction the *mela* is held. It is advocated that the site of the *mela* should be divided into blocks or sections by wide roads, one block or section being allowed for every 5,000 of the daily population, with one jemadar in charge of each block, and one sanitary inspector in charge of every four blocks. Instructions for the preparation of trench latrines, general conservancy, and slaughtering of animals then follow. The equipment needed is then dealt with, followed by a section on water supplies. For disinfection of wells, infected houses, bedding, clothes, etc., chlorinated lime or bleaching powder is recommended, and detailed instructions given as to how to use them. In four appendices methods of preservation of bleaching powder in the tropics, general methods of simple disinfection, measures for the prevention of epidemic diseases, and the use of kaolin in cholera are dealt with. Colonel Ross' little manual is a mine of useful and very practical instruction, and should be invaluable to all who have to deal with general public health matters.

BACTERIOLOGICAL CHART.—By P. Bannerjee, M.B., 7, Barik Lane, Amherst Street P. O., Calcutta. Second edition. Price 5 annas.

This well-executed chart will be found useful by all laboratory workers. The author tabulates in turn for all the commoner bacteria, their morphological appearances, motility or otherwise, optimum temperature for

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growth, viability, aerobic or anaerobic conditions of growth, staining properties, and appearances of growth on agar, potato, broth, gelatine and milk media, together with their fermentative properties to different sugar media. The table is well designed and, if framed and hung up in the laboratory, should be very useful to the laboratory worker for reference.

SRINIVASAN'S MEDICAL DIARY FOR 1925.—Published by V. Srinivasan, 44, Rattan Bazaar Road, Madras. Pp. 368. Price Re. 1.

THIS well-designed and well-bound little volume, which we regret to have received rather late in the year, will be of general usefulness to medical men in India. It contains much miscellaneous information of a practical nature, such as changes in the British Pharmacopœia since 1914, tables of metric, British and Indian weights and measures, a posological table, a list of new and non-official remedies with their chemical constitution, notes on incompatible drugs, on the indigenous names for recognised drugs, general prescriptions, medico-legal information, ophthalmic and dental notes, a very complete "national" calendar in which the dates of the months in English, Tamil, Telugu, Malayalam and Hindustani are given, and finally a diary giving a full page for each day of the year. The volume has obviously been compiled with considerable care, and should prove very useful to the general practitioner.

PERNICIOUS ANÆMIA AND APLASTIC ANÆMIA.—By Arthur Sheard, M.D. John Wright & Sons: Bristol, 1924. Pages 94. Price 7s. net.

THIS small book is a thesis presented for the M.D. degree of Leeds, and after reading it one is not surprised to learn that the degree with distinction was awarded.

The brief historical resumé of the subject is the best we have seen, it includes in six pages all the outstanding features of the story of pernicious anæmia. Then follows an account of fifteen cases which were studied in detail and a discussion of the causation of the disease. The author concludes that the disease is really a clinical entity which occurs in persons who have already had achlorhydria. The essential causative factor is a gastrointestinal infection whose nature is as yet unknown.

The treatment which is recommended consists in careful search for any focus of infection, especially in the region of the teeth. Arsenic is recommended, also the administration of a drink containing increasing amounts of hydrochloric acid. Blood transfusion and splenectomy are measures which are regarded as being worthy of consideration, but the author is by no means unduly optimistic as to their value.

Aplastic anæmia is regarded as a pathological syndrome rather than a disease; it is characterised by a serious diminution of the blood-forming function of the bone marrow, whereas in pernicious anæmia there is hyperplasia. The causes are either over-stimulation of the bone marrow with subsequent exhaustion, or primary inhibition of the blood-forming function of the bone marrow. Some of the ætiological factors are severe hæmorrhagic infections, trinitrotoluene poisoning, x-rays and arsenic.

There is no evidence of blood destruction in most cases, nor is there any attempt at blood regeneration, such as is seen in pernicious anæmia.

Although the thesis does not shed much light on the essential causation of these two grave forms of anæmia, it forms a valuable addition to the literature of the subject, and the observations of the cases which are recorded are models of completeness.

A MANUAL OF MEDICINE.—By Dr. T. K. Monro, M.A., M.D., Professor of Medicine, Glasgow University. Fifth edition. London: Baillière, Tindall & Cox, 1925. Pp. xviii plus 1033. Figs. 55. Price 25s. net.

THIS excellent and well balanced text-book has gone through five editions and one reprint since 1903. The

present edition has been thoroughly revised and new articles are numerous, for example such diseases as lethargica encephalitis, tularæmia and cœliac disease are described, and recent work on blood sugar and cardiology is dealt with.

A due proportion is maintained between the descriptions of the various diseases, those of minor frequency and importance are briefly described while fuller treatment is given to the great diseases which form the major part of the physician's work.

In the descriptions of the diseases of temperate climates there is little to criticise and the student and practitioner will find the book a thoroughly reliable guide. In some of the tropical diseases certain errors have crept in, for example, epidemic dropsy and famine dropsy are confused, so are the Japanese seven days' fever and the seven days' fever of Indian ports. Such mistakes are excusable as they are also found in standard text-books on tropical diseases, and it is likely that they will continue to be repeated in text-books on medicine for years to come.

The section on diseases of the nervous system is particularly good and the student who employs this book will find that his path through the mazes of this difficult subject is greatly simplified. In spite of the inclusion of modern methods of diagnosis and treatment, the author has successfully steered clear of the temptation to discard the older and simpler methods which have stood the test of time and which are in many cases most suitable for the general practitioner. There are quite as many temperature charts as it is customary to include in such text-books, and when we complain of the fewness of these we are not criticising this work except in common with the others of its class.

Monro's book will doubtless continue to be a popular and helpful text-book for years to come.

ANNUAL REPORTS.

ANNUAL REPORT ON THE HOSPITALS AND DISPENSARIES IN THE CENTRAL INDIA AGENCY FOR THE YEAR 1922, AND ON VACCINATION FOR 1922-23. BY LIEUT.-COLONEL W. R. BATTYE, D.S.O., I.M.S. CALCUTTA: SUPD'T. GOVT. PRINTING, INDIA, 1924. PRICE RS. 2-12-0.

THE total number of hospitals and dispensaries in Central India during the year was 215 as compared with 224 in the previous year. In 1921 nine dispensaries were closed by the Bhopal Darbar, and in 1922-23 three new ones were opened in Rewa State. There were improvements in the buildings at the King Edward Hospital, Indore, the Sehore Agency Hospital, and the Dewas Senior Branch Hospital. In all 1,579,456 patients were treated during the year, including 20,826 in-patients. The chief diseases treated—in order of prevalence—were malaria, eye diseases, skin diseases, disorders of the digestive system, ulcers and rheumatic affections. Admissions for both syphilis and tuberculosis showed a marked increase on those for the previous year. The King Edward Hospital, Indore, is doing splendid work, but is severely hampered by want of funds in all its activities. The Indore State Medical Department continued to make good progress, especially in its electrical and radium department and in clinical laboratory work.

There were 372 qualified medical men and women in Central India during the year; viz., 5 I.M.S. officers, 225 graduates of Indian universities, 1 male mission doctor, 119 sub-assistant surgeons, 13 private practitioners, 4 lady doctors of missions, and 5 Indian lady graduates. Also 89 senior compounders who held charge of smaller dispensaries. The total sum expended by the Durbars on medical institutions during the year was Rs. 7,11,995, and that from Imperial revenues

Rs. 1,30,296. The former represents a proportion varying from 1.1 to 5 per cent. of the total revenue for different States.

Turning to vital statistics for the year, the registration is admittedly inaccurate and the actually recorded birth-rate is only 8.05 per mille. The variation in neighbouring States however varies from 10 to 18 per cent. and it is obvious that this figure is quite untrustworthy. The total number of deaths has fallen from 238,494 in 1919 during the influenza pandemic, to 58,914 in 1921, and 51,032 in 1922.

Vaccinations numbered 146,396 in all, and 188 vaccinators were employed during the year 1922-23.

The Central India Agency was free from cholera during 1922, but plague was of rather severe type and caused 1,019 attacks with 747 deaths. Rewa State and Bundelkhand suffered most severely, whilst the disease appeared in Nowgong Cantonment for the first time. It was prevalent both from February to April and from September to December. Small-pox was unimportant during the year, but influenza caused some anxiety in Indore, Bundelkhand and Baghelkhand; a total of 2,448 cases with 100 deaths is reported.

There is only one lunatic asylum in Central India,—that in Indore city, with accommodation for 12 patients. Colonel Battye reports that "this building is not fit for the accommodation of human beings." During the year Her Highness the Maharani Chandrawati-Bai very kindly offered a large building at Banganga for this purpose, but—owing to the usual lack of funds—it could not be utilised. Lepers are accommodated in four asylums, at Indore city, Barwani, Sehore and Dhar,—the second a new institute, and the fourth run by missionary enterprise.

Returns are recorded from 33 jails and lock-ups for the year. Their death-rates shew most extraordinary variations, from 14.9 per mille for Indore State central jail to 107.9 per mille for Rewa central jail. The latter indeed reported a death-rate of 158 per mille in 1921. At Nowgong district jail under the Imperial government the death-rate was 20.6 per mille.

There were 21 pupils trained under the auspices of the Victoria Memorial Scholarship Fund in midwifery and child welfare at the King Edward Hospital, Indore during the year, and 6 at the Bhopal State Hospital. There were 100 students at the Medical School attached to the former institution, on January 1st, 1922, of whom 22 qualified during the year. Admission of new students was temporarily suspended for some months whilst an enquiry was held as to whether funds would permit of further admissions; fortunately the School was re-opened for fresh admissions in July, 1922, and by the end of the year 138 students were attending the School.

REPORT ON THE LUNATIC ASYLUMS IN BURMA FOR THE TRIENNIUM 1921-23. BY COLONEL P. DEE, I.M.S., INSPECTOR-GENERAL OF CIVIL HOSPITALS, BURMA. RANGOON: SUPDT., GOVT. PRESS. PRICE RE. 1-14-0.

THE two mental hospitals in Burma, at Rangoon and Minbu respectively, continued to function during the triennium. Their total accommodation is for 770 patients, but there has been a marked increase in the numbers admitted, and at the end of 1923 there were no less than 1,155 patients; 992 males and 165 females. Overcrowding at the Rangoon asylum has therefore been the outstanding feature of the triennium, and relief was obtained only by using day sheds and work sheds as sleeping barracks for the excess population. A new asylum is in course of construction at Tagdale, and it is hoped to open this shortly. Even so, however, it is evident that the accommodation provided is far too little for present-day requirements.

General health was good during the triennium, the daily average sick having fallen from 152 in 1921 to

123 in 1923. There was no epidemic disease, but the inmates of the Rangoon asylum were inoculated against plague when this disease was prevalent in Rangoon town. Mortality was 9.74 per cent. of patients in 1923. This rather high figure is due to the admission of new patients in a bad state of health; no less than 12 out of the 66 deaths which occurred were among patients who had been less than six months in the asylums. Tuberculosis, with 24 deaths, heads the list, followed by chronic diarrhoea and dysentery with 15 deaths.

Rangoon itself supplied no less than 56 per cent. of the admissions; and Major Robson, I.M.S. attributes this to the fact that Rangoon is the main artery of flow of the immigrant itinerant labour into and out of Burma. This labour is of very poor type, and liable to both tuberculosis and confusional insanity following upon acute specific diseases. Almost 70 per cent. of the patients were between 20 and 40 years of age.

The chief types of insanity among the cases treated were mania and melancholia; 20 cases of insanity were attributed to the use of *Cannabis indica* and some 50 per cent. of such cases are curable. There was only one escape during the triennium. There was one case of fatal and accidental injury; and one of murderous assault by a patient in the Rangoon asylum on an overseer and two door-keepers. Injury compensations of Rs. 175, Rs. 100 and Rs. 40 were paid to these three individuals.

The main lines of treatment are to keep all new admissions as free from distracting influences as possible, to restore the general health by regular and careful dieting, and to secure the maximal amount of sleep obtainable, assisted as necessary by sedative medication. In minor cases paraldehyde is the great stand-by; for states of excitement and agitation, bromides and chloral are best; finally hyoscine will frequently act in intractable cases where all other agents have failed. Once convalescent, the patient is put on to occupational therapy, gardening, weaving, tailoring, road repairs, cleaning and keeping quarters; males also to paddy grinding, dairy, carpentry, and masonry, females to cleaning paddy. The system of paying monthly stipends to well-behaved inmates at varying rates according to merit is very much appreciated in Rangoon asylum.

Conservancy is good, and the buildings are clean and comfortable. Amusements, including *frées*, and musical and gramophone parties are held periodically. At Rangoon asylum there are annual sports for inmates, and the Rangoon Battalion A.F.I. band plays once a week. Newspapers are permitted to well-conducted patients, and friends and relatives are permitted to visit suitable patients.

The garden and dairy at Rangoon asylum is self-supporting, and is even making money.

Colonel Dee complains with some justice of the casual way in which medical history sheets of newly admitted patients are filled in, information with regard to past history, hereditary influences, etc., being written up as "unknown." Such case sheets are quite useless, but it is difficult to get a committing magistrate to take an interest in such matters as hereditary influences, occupation, etc. Delays and omissions to send in the prescribed documents with criminal lunatics are another source of considerable trouble. Twelve meetings of the Committee of Management of the Rangoon asylum and five of the Minbu asylum were held during the triennium, the latter but poorly attended, 3 members present as a rule out of 10.

Receipts in 1923 amounted to Rs. 3,28,854, the amounts realised from paying patients totalled Rs. 49,558, and the net expenditure was Rs. 2,76,142. Receipts from paying patients shew a steady increase annually. The cost of diets was appreciably reduced, in spite of the marked increase in population to be fed, chiefly by making better and more favourable contract rates. The one and only donation towards the splendid work which these two asylums carried out during the triennium was a

donation of Rs. 100 by His Excellency Sir Harcourt Butler, Governor of Burma.

REPORT OF THE EUROPEAN MENTAL HOSPITAL AT RANCHI FOR THE TRIENNIUM 1921-23. BY MAJOR O. A. R. BERKELEY-HILL, M.D., I.M.S. PATNA: SUPERINTENDENT, GOVERNMENT PRINTING, BIHAR AND ORISSA, 1924.

MAJOR BERKELEY-HILL's annual reports are always interesting reading, and this one is no exception to the rule. During the triennium, the Ranchi "asylum" became a "mental hospital," and the former "blocks" became wards, at least in name. Female attendants have replaced the former male attendants in the male section, with the exception of one European male attendant who has been retained in order to run the brass band and the patients' outdoor games. This change has been all to the good, and there has been a marked improvement in the general condition of the male patients, even of the worst cases; patients who had been addicted to walking about exposed have taken to clothing themselves and behaving properly, whilst those with a tendency to violent behaviour have "invariably responded to feminine influence." Wards are no longer untidy, and meals are punctually and agreeably served. The Local Government have adopted a proposal to abolish the post of European head attendant in the male section, and instead to recruit from Home a matron-in-chief.

The most notable event during the triennium was the constitution of a board of trustees, which took over the entire management and control of the hospital with effect from July, 1922. Another important event was the affiliation of the hospital in 1922 to the University of London in connection with the examination for the diploma in psychological medicine; and Dr. Jyotirmoy Roy, civil assistant surgeon of the Ranchi hospital, is to be congratulated on having taken this diploma after 16 months of study leave in England.

The number of patients accommodated varied from 167 in 1921 to 151 in 1923, admissions averaging 52 per annum. Re-admissions reached a total of 12 during 1923; and Major Berkeley-Hill comments with regard to this on the way in which relatives evade the responsibility of maintaining discharged patients; "in the present state of the law it is not possible to bring pressure to bear on relatives to take charge of cases sufficiently well who no longer need institutional care, except married women whose husbands are bound by law to support them, and children whose care parents cannot refuse or evade." Under the existing laws the "patient" is defined as such from the legal and not from the medical point of view; "in effect the attitude which the law takes to a person suffering from mental disease is that he shall not enter an asylum for care and treatment unless circumstances force it, nor shall he remain there, if it is possible for him to be outside. Nowhere does the law urge upon citizens the duty of taking prompt steps for the proper care and treatment of the mentally afflicted; on the contrary, it treats such steps with suspicion and imposes restrictions, so much so that those primarily concerned, i.e., the patient, his medical attendants and his friends and relatives, avoid invoking the law's aid." In no less than 33 per cent. of the cases admitted during the triennium there had been failure on the part of the committing magistrates to comply with the provisions of the law, and in such cases the medical superintendent is open to a process at law. The demand for reform in the lunacy laws in India, says Major Berkeley-Hill, is very urgent; and he states that matters are nearly as bad in India as in Spain, where a father was so worried about the difficulties of admitting his insane son to an asylum that he committed suicide.

Criminal insanes decreased in number during the triennium from 12 to 3, but there was an increase in

the number of voluntary boarders from 5 to 11. Of 21 such voluntary boarders no less than 18 recovered without being formally committed as patients. The bad old custom of detaining suspected insane persons in jails for observation of their mental state still persists throughout India; and, as every civil surgeon knows, is a "deplorable anachronism." "Were the public aware of the suffering frequently caused thereby to persons afflicted with mental diseases, it is likely that my yet feebly appreciated plea for the institution of a psychopathic ward in every general hospital of any size would become a matter of real significance to the public," writes Major Berkeley-Hill. In one matter, however, he has secured reform; female patients sent for admission are now accompanied by at least one European or Anglo-Indian nurse, instead of only by a police sergeant.

The mean annual population in the hospital during the triennium was 206, of whom 114 came from Bengal, 57 from the United Provinces, and only 14 from Bihar and Orissa. Eleven per cent. of cases are recorded as cured, and 2.4 per cent. as improved. The two months' parole system has worked well, 7 out of 10 such cases on parole having been finally discharged cured at the end of the two months' absence. Committees of visitors have been formed in Calcutta, Lahore and Allahabad to watch and report on patients discharged from the hospital to a home environment which there was good reason to suppose was defective from a mental hygienic standpoint. The reports received by the follow-up letter system have been highly satisfactory in the majority of cases. The Government of Burma have given a lead to all India by incorporating a mental branch in their new Hygiene Institute.

Deaths totalled 7.09 per cent. of the daily average strength, the chief cause being pneumonia. The daily average sick rate was 4.71, as compared with 6.01 in the previous triennium, malaria being the chief cause of sickness. One patient having been assaulted by a member of the inferior staff, the case was referred to the court of the sub-divisional officer, Ranchi, but no conviction followed. It is to be noted that the Indian Lunacy Act of 1912 entirely omits to include any penal clause for dealing with an assault on a patient by a member of the staff of a mental hospital.

The chief forms of mental disorder treated were primary and secondary dementia, 70 cases per annum; dementia praecox, 54 cases; delusional insanity and paranoia, 18 cases; and circular insanity, 11 cases. The hospital obtained the services of a qualified dental surgeon, Dr. Mono Mohan Das, towards the end of 1922; and Major Berkeley-Hill notes how, at the Trenton State Hospital, U. S. A., the introduction of the thorough treatment of oral and dental sepsis was followed by an increase in the average number of monthly discharges from 43 per cent. to 80 per cent. With regard to general therapy, occupational therapy looms large: hydrotherapy is used in an increasing degree; whilst psycho-analytical treatment can now be carried out in the newly completed psychological laboratory. 97 patients were granted local parole, and 30 Ranchi parole during the triennium, with no untoward results. The band played regularly during 1923, and weekly concerts are held; the fund for the purchase of a cinematograph continues to grow; whilst Major Berkeley-Hill has made over his own collection of over 400 books to the institution's library. Twenty-four papers and articles were published by the members of the staff during the year, or read before learned societies. Two "shelters" in the grounds have been converted into aviaries, and two others into work-shops. The average expenditure per annum has risen from Rs. 1,12,958 in the triennium 1918-20, to Rs. 3,59,661 in 1921-23; this may seem objectionable from the point of view of a finance department, but it means a very real and solid advance in the comfort and happiness of the patients concerned.

In the final section of his report, Major Berkeley-Hill deals with problems and difficulties. He considers the appointment of a qualified alienist to the staff, in

addition to the Medical Superintendent, essential; but where is such a person to come from? No military assistant surgeon who has taken a British degree will take up such unremunerative work, whilst it is unlikely that any qualified British alienist would care to work in a place where the facilities for pathological work for example are a disused lavatory, 7 ft. 9 in. by 8 ft. in dimensions, fitted up as a laboratory. There are very few qualified alienists among the junior ranks of the I. M. S., whilst recruitment of British officers to that service now barely fulfils military requirements. Possibly the problem can be solved by the appointment of an alienist "belonging to one of the numerous nations in Europe for whom the conditions of existence have been rendered so intolerable by the Treaty of Versailles that men are willing to take up employment on a very moderate stipend to escape the confines of their own country"; and three such applications have been received, one from a highly trained and well known neurologist and psycho-therapist. Here the difficulty is how to get a medical man with medical degrees taken on the continent of Europe, but not in Great Britain or India, on to the medical register in Bihar and Orissa. Anyone familiar with red tape will realise the seriousness of such a problem, but Major Berkeley-Hill hopes that it is not incapable of solution.

A second difficulty is the nursing problem; "the pay and conditions of service are decidedly good, but mental hospitals are still regarded as God-forsaken places of confinement, and many people still feel that it is a disgrace to be connected with them in any capacity"; in the last 12 months there have been 16 changes in personnel among a nursing personnel of 14. The ideal mental nurse has still to be found; at present she does not exist, even in America, where the same problem has to be faced in the mental hospitals.

If we have devoted space to Major Berkeley-Hill's report, it is because of its great interest. The problems of mental diseases in India—especially among India's European community—present many features different from those in Europe. The subject is as yet an almost untilled field; how little attention it has received may be gathered from the usual and disgraceful practice of detaining such suspected insane persons in jails for observation. The change from regarding asylums as "asylums" to regarding them as "mental hospitals," however, and the introduction of the committee system of management in place of routine government supervision, are both steps in the right direction, and hold promise for the future study of mental disease in India.

Correspondence.

INTRAVENOUS VERSUS INTRAMUSCULAR QUININE.

To the Editor. "THE INDIAN MEDICAL GAZETTE."

SIR,—Will you permit me to make a few remarks on Dr. R. A. Murphy's letter on "Intramuscular Quinine" appearing on page 48 of your January 1925 issue.

With my own experience to back me, I sturdily answer his question in the last line of paragraph 2 of his letter with a *Yes!* There is no doubt that in cerebral malaria the intravenous route is the only one, which makes an early impression, but this must be combined with amyl nitrate inhalation when available (to open up the blocked capillaries) and either adrenalin (1-1000) solution m.x. or $\frac{1}{2}$ c.c. pituitrin to combat collapse. And what about the type known as abdominal malaria, where the splanchnic vessels are similarly charged with malarial organisms? I have seen more than one case of "this type labelled acute peritonitis and made ready for the operation table, which yielded almost magically to an intravenous quinine injection in 12 hours or less! This

is more than one can say of quinine by the intramuscular route which I believe takes 4 to 6 hours for its absorption.

Personally, I loathe intramuscular quinine injections whether in the arm or gluteus, and I would never undertake one without the gravest qualms of conscience, and certainly never in private practice! A case of necrosis of the glutei muscles which I saw in hospital practice some 17 years ago made the deepest impression on my then young mind—the case was that of an intensely anæmic Hussar who was the subject of malignant tertian malaria and who had eventually to be invalided from the army on account of a completely destroyed right gluteus which was incapable of being restored to normal bulk. Repeated cultures proved sterile, which rules out any doubt of care and caution in technique. Partly, the huge dose of 20 grains of quinine bichloride given was to blame for the unhappy result.

On the other hand I have given hundreds of intravenous injections and have never met a case that did not live to be photographed, nor have I heard of one. Quinine is an antiseptic of high power and is easily absorbed into the blood when injected into the stream direct. I am convinced that in time the intravenous route will be the *prima via medicatrici* of most medicines and the profession will have then lost their shyness and fear of this method.

One more remark, Sir, before I conclude. In the editor's note to Dr. Murphy's letter it is said that "tetanus spores were present in the distilled water," which, it is concluded, caused death from tetanus in the sad case you relate, with which I am also familiar. The point is whether such spores can produce the disease at all. On page 793 of Dientafoy's "Text-book of Medicine," Vol. II, it is claimed that sporular cultures of tetanus from which the living bacilli and tetanus toxins have been removed by heating for 3 hours at 80° C. are harmless in the guinea-pig as long as they are not associated with a culture of the so-called assisting microbes or with a mechanical agent such as lactic acid, producing negative chemotaxis as regards the phagocytes. It is possible to inoculate guinea-pigs with doses of $\frac{1}{4}$ to $\frac{3}{4}$ c.c. of these cultures, which contain only spores, without the animal presenting symptoms of tetanus. The pure spores do not germinate in healthy tissue and therefore cannot produce the toxin which is indispensable to the development of tetanus.

I am not a bacteriologist, Sir, but when an eminent physician like Dientafoy speaks, one must listen. The only point now remaining for elucidation is whether or not the malaria protozoon can correctly be regarded as an assisting microbe to the tetanus bacillus. Personally, for obvious reasons, I think not. I know the theory of the harmlessness of tetanus spores to healthy tissue will stagger the average practitioner, and it certainly set my mind dwelling on the fourth dimension. But is this after all any more wonderful than the residence of diphtheria organisms in the human throat without any active sign of the disease? These are points for the future to settle.—Yours, etc.

B. J. BOUCHE,
Asst. Surgn., I.M.D.

JURONG: SIMLA HILLS,
2nd March, 1925.

[Note.—As shown by Majors Acton and Chopra, intramuscular injections of any of the cinchona alkaloids are followed at the site of injection by focal necrosis of the muscle tissue, whilst if an acid salt be used—as is usually the case—there is, in addition, local hæmorrhage and œdema. Such focal necrosis is a sterile one; but it is capable of providing an anærobic nidus in which any tetanus spores introduced will germinate and cause tetanus. A well known experiment in pathology is that washed tetanus spores when introduced into the muscles of the guinea-pig do not give rise to the disease; but if the site of injection be crushed so as to provide a suitable focal necrosis, the disease ensues. Should septic organisms settle in the nidus, an abscess will result.

The medical practitioner who decides to give intramuscular injections of the cinchona alkaloids should visualise for himself the conditions which will result and decide whether or not the injection should be given.—
EDITOR, I.M.G.]

AN ANTIMONY RASH.

To the Editor, "THE INDIAN MEDICAL GAZETTE."

SIR,—I shall be much obliged if you will kindly publish the following note on a case of kala-azar in your paper. The case appears to be an interesting one and suggests the need for more study and observation on the cases treated by urea stibamine with reference to the particular point concerned.

The patient was a Hindu lady aged 25, with 5 months' undulant fever but with no clinical signs and symptoms of kala-azar and no malaria. Liver puncture showed films negative but N.N.N. culture positive on the 7th day, thus proving kala-azar to be the diagnosis. Urea stibamine was started and given every alternate day, the temperature running from 103 to 105° F. daily. After the 9th injection (1.95 grm.) of urea stibamine the temperature came down to normal. Three more injections were given in decreasing doses at longer intervals, but with each injection a most unbearable and troublesome type of itching was found to commence all over the body immediately after the injection, with the production of a peculiar red eruption like an urticarial rash—(urea stibamine rash, I should call it)—all over the body, lasting only for half an hour. The patient had no trouble in the intervals of treatment. The injections were now discontinued. The patient was seen again four months later and found to be keeping quite good health. No puncture was done to prove cure. The doses given were 0.1 gm., 0.15 gm., 0.2 gm., 0.25 gm., 0.25 gm., 0.25 gm., 0.25 gm., 0.2 gm., 0.2 gm., 0.15 gm., and 0.1 gm., in 2 per cent. solution. The salt was purchased from Messrs. Bathgate & Co., Calcutta, and the patient was treated in Shillong. The idea of publishing this case is to ask medical men whether any of them have noticed such a *urea stibamine rash* in any of the cases treated by urea stibamine.—Yours, etc.,

SARAT SASI KUNDU, M.B.,
Assl. Surgn., Sylhet.

Sylhet,
5th March, 1925.

Service Notes.

APPOINTMENTS AND TRANSFERS.

Lieutenant-Colonel J. M. A. Maemillan, M.D., F.R.C.S., I.M.S., is appointed to be Civil Surgeon, Simla (East), with effect from the date on which he assumes charge from Lieutenant-Colonel Sumner.

Lieutenant-Colonel G. Hutcheson, M.B., I.M.S., is appointed to officiate as Inspector-General of Civil Hospitals, United Provinces, during the absence on leave of Colonel A. W. R. Cochrane, I.M.S.

The services of Lieutenant-Colonel F. W. Sumner, M.D., F.R.C.S.E., I.M.S., Civil Surgeon, Simla (East), are replaced at the disposal of the Government of the United Provinces, with effect from the 25th March 1925.

Lieutenant-Colonel J. Masson, I.M.S., is appointed as civil surgeon of Ranchi, with effect from the 21st November 1924.

Lieutenant-Colonel J. Masson, M.B., F.R.C.S.E., I.M.S., is appointed to officiate as Inspector-General of Civil Hospitals, Bihar and Orissa, with effect from the 13th March 1925.

Lieutenant-Colonel L. Cook, I.M.S., is appointed as civil surgeon of Bhagalpur, with effect from the 17th November 1924.

The services of Lieutenant-Colonel H. G. Stiles-Webb, I.M.S., are placed temporarily at the disposal of the Government of the Central Provinces with effect from the 14th February 1925.

Major A. W. Dunean, I.M.S., officiating civil surgeon of Shahabad, is appointed to act as civil surgeon of Champaran during the absence, on leave, of Major C. G. Howlett, I.M.S., with effect from the 1st April 1925, or any subsequent date from which he may avail himself of it.

The services of Captain G. H. Fraser, I.M.S., are placed temporarily at the disposal of the Government of Bihar and Orissa for employment as Officiating Superintendent, European Mental Hospital, Ranchi, with effect from the date on which he assumes charge of his duties.

Captain C. H. N. Baker, M.C., I.M.S., has been appointed to be Officer-in-Charge, Medical Stores Depot, Rangoon, in addition to his other military duties, with effect from the 3rd December 1924.

Captain A. C. Craighead, M.B., I.M.S., is appointed temporarily to the Medical Research Department and posted as a Supernumerary Officer at the Central Research Institute, Kasauli, with effect from the date he takes over charge.

The services of Captain N. Briggs, I.M.S., are placed temporarily at the disposal of the Government of the Punjab for employment in the Jail Department.

LEAVE.

Colonel A. W. R. Cochrane, M.B., F.R.C.S., I.M.S., Inspector-General of Civil Hospitals, United Provinces, is granted leave on average pay for 3 months with effect from the 8th April 1925 or the subsequent date from which he may avail himself of it.

Colonel J. A. Black, M.B., I.M.S., Inspector-General of Civil Hospitals, C. P., is granted leave on average pay for 5 months and 27 days combined with leave on half average pay for a total period of 8 months with effect from the 13th March 1925, or the subsequent date on which he may avail himself of it.

Colonel H. Ainsworth, M.B., F.R.C.S., I.M.S., Inspector-General of Civil Hospitals, Bihar and Orissa, is granted leave on average pay for five months and twenty-four days and leave on half average pay for the remaining period up to a maximum of eight months leave in all, with effect from the 13th March 1925, or the date on which he avails himself of the leave.

Major G. M. Millar, O.B.E., I.M.S., an Agency Surgeon, is granted combined leave for one year with effect from the 22nd November 1924.

Major O. A. R. Berkeley-Hill, I.M.S., Medical Superintendent of the Ranchi European Mental Hospital is allowed leave for eight months on medical certificate, viz., leave on average pay for six months and twenty-one days and leave on half average pay for the remaining period (including leave not due for nineteen days) with effect from the 6th February 1925, under Fundamental Rules 77, 81 (b) and 81 (c).

PROMOTIONS.

Major to be Lieutenant-Colonel.
W. S. Nealor. Dated 31st January 1925.

Captains to be Majors.
E. Calvert, M.B. Dated 25th July 1924.
R. Sweet, D.S.O., M.B., F. Phelan, N. C. Kapur, N. K. Bal, M.C., H. S. G. Haji, M.C. Dated 25th January 1925.

Lieutenant to be Captain.
R. C. Phelps, M.B. Dated 19th February 1921.
(The seniority of this officer in the rank of Captain dates from 1st November 1916 as notified in the *London Gazette*, dated 19th January 1923.)

RETIREMENTS.

Subject to His Majesty's approval, Colonel F. Wall, C.M.G., K.H.S., I.M.S., is permitted to retire from the service with effect from the 5th March 1925.

The King has approved the retirement of Lieut.-Col. H. Emslie-Smith, M.B., I.M.S., with effect from the 6th January 1925.

THE MINTO MEDAL FOR RESEARCH WORK IN TROPICAL MEDICINE.

THE Minto Medal of the Calcutta School of Tropical Medicine and Hygiene, which is awarded annually to an Indian worker for distinguished research work in tropical medicine, has been awarded for 1924 to Major R. N. Chopra, M.A. M.D. (Cantab.), I.M.S. Our readers are well aware of the valuable and critical work which Major Chopra has carried out in the field of pharmacology and of investigation into Indian indigenous drugs, and will agree with us in congratulating him on its recognition.

Previous recipients of the medal for the years 1920-1923 have been Lieut.-Colonel R. Row, M.D. (Lond.), D.Sc. (Lond.), O.B.E., I.M.S.; Rai Dr. U. N. Brahmachari Bahadur, M.A., M.D., Ph.D.; Captain K. R. K. Iyengar, M.B., D.P.H., I.M.S., and Dr. D. A. Turkhud, M.B., C.M. (Edin.).

NOTES.

MESSRS. WATSON AND SONS' (ELECTRO-MEDICAL) NEW APPARATUS.

MESSRS. WATSON AND SONS (Electro-Medical), Sunic House, 43, Parker Street, Kingsway, London, W.C. 2, have always been noted for the fineness of their radiographic instruments and for their pioneer work in radiography. Two of their recent bulletins contain accounts of novelties of much interest.

The first deals with the "Sunic Intensifier Screen," the result of three years of experiment and investigation. In order to convert x-rays into rays of greater photographic power and reduce the exposure, calcium tungstate has proved the most satisfactory substance for the screen. Yet there are difficulties; supplies of this compound are often impure, whilst a binder has to be used to hold the minute crystals of the salt together, and yet must be used in such minute quantity that perfect freedom from grain with maximum effectiveness may be obtained. As regards the fineness of grain the Sunic Intensifier Screen is so fine that it is claimed that in high power micro-photography there is only a trifling difference between negatives made with and without the screen. The screen is claimed to be considerably faster than other screens on the market; the utmost care is taken to ensure good contrast and uniformity; whilst the screen is claimed to be so durable that it will withstand nail scratches, can be vigorously washed with a sponge and hot water, or even with a soft nail-brush; whilst it is soft and pliable and can easily be bent or even rolled without danger of cracking the surface. The prices vary from 15s. each of $6\frac{1}{2} \times 4\frac{1}{2}$ in. size, to £3 7s. 6d. for the 15×12 in. size; whilst balanced paired screens are also supplied for double screen technique.

The second brochure deals with the "Sunic" Potter-Bucky Diaphragm. This is a moveable grid, worked by a spring motor, aiming at giving radiographs cleaner, richer in detail and of greater diagnostic value than before. During the making of radiographs, a certain proportion of the rays are scattered by the tissues of the body, and it is the object of the Potter-Bucky Diaphragm to cut out the scattered rays, some 85 or 90 per cent. of which should be cut out if the grid is to be successful in achieving its object. The "Sunic" Potter-Bucky Diaphragm is constructed of alternate strips of wooden and leaden strips, the materials for which are very carefully selected. The wooden strips act as windows, permitting the passage of the rays; the leaden strips as stops, cutting out the scattered rays.

The framework of the apparatus has been made substantial, and is largely of metal and aluminium, with an aluminium top. The grid is large enough to cover a 14×17 in. film, whilst the lead strips are only $2\frac{1}{2}$ 100ths of an inch thick and are claimed to secure an interception of some 85 to 90 per cent. of scattered peripheral rays. The grid allows of very considerable range of focal distance and of stereoscopic adjustment in both directions. In connection with the motor, there are timing and signal devices. For use on heavier parts of the body where long exposures are necessary, a compression device is also included. The cost, complete with all accessories, is £50.

'TABLOID' PHOTOGRAPHIC DESENSITISER.

PHOTOGRAPHERS, who are not able to have the convenience of a dark room, can develop their plates as easily as gaslight paper by using 'Tabloid' Desensitiser, which has just been put on the market by Messrs. Burroughs, Wellcome & Co. For tourists and travellers it is most valuable, because development can be carried out in any room or cupboard from which light can be excluded for a minute. From ordinary dark rooms it removes the inconvenience of gloom and relieves the eyes of strain.

After one minute's treatment in the dark, development of the great majority of plates can be completed by candle light, or in the shadow of the body, in a room lighted by ordinary gaslight or incandescent electric light; ultra-sensitive and colour plates by bright yellow light, or, with care, even by candle light or dim gaslight.

The action of the Desensitiser is to remove a great proportion of the sensitiveness of the emulsion without destroying the latent image created by exposure.

One great advantage of 'Tabloid' Desensitiser is that it enables panchromatic plates to be developed in a comfortable light. It is issued in cartons of 25.

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Original Articles.

ABDOMINAL TUBERCULOSIS IN
INDIAN PRACTICE.*

By F. W. C. BRADFIELD, M.S., F.R.C.S.,
LIEUT.-COLONEL, I.M.S.,
General Hospital, Madras.

TUBERCULOSIS amongst cattle appears to be unknown in the Madras Presidency, and although no bacteriological investigations have been made, it is more than probable that this absence of bovine tuberculosis influences the incidence and character of the disease in South India. Tuberculous diseases of bones and joints, though not so commonly seen as in European hospitals, pursue a much more intractable course and are less amenable to non-operative forms of treatment. The economic problems of this country and the ignorance of people of the hospital class are contributory factors, but multiple lesions are more common and the surgical forms more frequently complicated by the presence of lesions in the lungs.

In 1924, 205 patients were admitted to the General Hospital, Madras, for surgical forms of tuberculosis or 2.1 per cent. of the total admissions. The sites of the disease were as follows:—

| | | | |
|--------------------------|----|----|-----|
| Abdomen | .. | .. | 95 |
| Lymphatic glands | .. | .. | 39 |
| Bones | .. | .. | 35 |
| Joints | .. | .. | 28 |
| Abscess (not classified) | .. | .. | 3 |
| Skin | .. | .. | 2 |
| Testis | .. | .. | 1 |
| Kidney | .. | .. | 1 |
| Larynx | .. | .. | 1 |
| Total | .. | .. | 205 |

Abdominal tuberculosis (including enteritis 20) accounted for 95 of these patients or 0.97 per cent. of the total admissions to the hospital—a very much higher percentage than is found in European general hospitals, and a figure approximating to that of children's hospitals, where it generally averages from 0.05 to 2 per cent. of the total admissions.

The admissions to the medical and surgical wards were as follows:—

| | | | |
|-------------------------|----|----|----|
| Tuberculous peritonitis | .. | .. | 55 |
| Tuberculous enteritis | .. | .. | 20 |
| Tuberculous cæcum | .. | .. | 20 |

I have endeavoured to estimate the value of surgical treatment in what is undoubtedly a common form of tuberculosis in South India by a study of the First Surgeon's operation registers of the General Hospital for the past 6 years. These researches only show the type of disease found and the immediate results of operation. The difficulty of tracing Indian patients is very

great, but some idea of the ultimate results can be obtained from my personal notes. Most of our enquiries remained unanswered. One patient who replied some months after the notices had been sent, had been so alarmed at the receipt of a letter that he had only opened it when he considered a safe period had elapsed.

The results of operation have been as follows:—

| | Total. | Mortality. | Ratio. |
|-------------------------|--------|------------|--------|
| Tuberculous peritonitis | 43 | 14* | 32.5% |
| Tuberculous cæcum— | | | |
| Excision of cæcum | 14 | 2 | 14.2% |
| Ileo-colostomy | 6 | 0 | 0 |
| Simple laparotomy | 7 | 0 | 0 |
| Cæcostomy | 1 | 1 | |

* 3 died within three months of leaving hospital.

I. Tuberculous Peritonitis.—1. Ascitic Variety. Of 3 patients operated upon, one

PLATE I.



Tuberculous disease of cæcum showing extensive polypoid formation of the mucous membrane, also thickening with stenosis at the junction of ileum and cæcum.

with extensive involvement in the pelvis died after 2 months. This variety in its true form is comparatively rare, and not enough cases have been recorded to test the value of simple laparotomy, the treatment usually advocated. Operation, when fluid in the abdomen has been diagnosed, has generally revealed the presence of the numerous adhesions which characterise the next type

* Being part of the Annual Surgical Report, Madras General Hospital, 1924.

and in which the results of operative interference are very poor.

2. *Fibrous and Adhesive Variety.*—Of 40 patients submitted to operation, 11 died, a mortality of 27.5 per cent. Many of these patients were operated upon for acute complications. Perforation of tuberculous ulcers with resulting acute peritonitis accounts for 4 with 4 deaths, intestinal obstruction 5 with 3 deaths, infected tuberculous abscess 4 with 3 deaths. In 6 patients enlarged tuberculous glands were a prominent feature, and in two of these infection had taken place in chronic abscesses with fatal result.

PLATE II.



Tuberculous disease of caecum showing tuberculous fibroid infiltration of the wall with stenosis.

The average age of the majority of these patients (22 out of 39) was between 20 and 30 years. In typical cases diagnosis is not difficult. Abdominal pain, sometimes with definite relation to taking food, and fever are complained of, while a doughy, distended abdomen, often with evidence of free fluid in the peritoneal cavity, sometimes with a tumour mass or with peristalsis due to chronic obstruction are signs which cannot be mistaken. In the early stages a chronic dyspepsia, resistant to treatment and combined with tenderness in the right abdomen, may render diagnosis difficult, but the pain never has the relapsing character of that of a duodenal or gastric

ulcer. A tumour mass may call for an exploratory laparotomy, but the results, immediate and remote, with these patients are very poor.

II. *Tuberculous Diseases of the Caecum.*—Ileo-caecal tuberculosis as described by Hartman (to whom we owe the best description of this disease) is a form of tuberculosis very amenable to operative interference and more common than is generally recognised. A record of 20 cases in one year is evidence that the disease is very common in South India, though it is probable that many of these patients, who were not submitted to operation, were really extensive examples of fibrous peritonitis. The disease

PLATE III.



Tuberculous caecum showing stenosis and fibroid thickening.

occurs in two forms, in both of which a mass is found in the right iliac fossa. The *entero-peritoneal form* is an ulcerative caseous tuberculosis not confined to the caecum but attacking also the ileum and the appendix. The ileo-caecal region becomes lost in a mass of adhesions, among which caseating cavities, often forming in the later stages pyo-stercoral fistulae, are found. This variety may simulate an appendicitis and the signs are those of an enteritis, never of obstruction. The lungs are frequently involved. Actinomycosis has never been seen in South India, but in other countries may produce similar symptoms. The *hyperplastic variety* simulates a

PLATE IV.



Ileocecal tuberculosis. Hyperplastic variety.

neoplasm in the right iliac fossa and after a very vague, insidious onset, the symptoms are those of a chronic intestinal obstruction. Tuberculous foci are scanty, surrounded by a dense fibrous tissue mass and associated with other purely inflammatory lesions, as for example, dense sclero-adipose thickening and the production of numerous polypi and vegetations in the mucous membrane. The disease in this variety is confined until late to the cæcum, the walls of which are converted into a hard, rigid mass associated often with very extreme stenosis. Ulcers are sometimes found in the ileum and a similar hyperplastic condition

PLATE V.



Tuberculous cæcum with extensive thickening of the wall of the cæcum, and stenosis. Necrotic condition of mucous membrane.

may occur in other parts of the larger intestine. The lymphatic glands are often markedly infected.

The disease, as we have seen it at operation, has had the characters of the hyperplastic variety rather than of the ulcerating caseous enteroperitoneal form. There are a number of specimens of the disease preserved in the Medical College Museum, all of which show massive fibrous formation in the walls of the cæcum. Of 28 patients, whose operations were recorded, 6 were too ill or had too extensive mischief to allow of more than an exploratory laparotomy and cannot be classified. Five appeared to have been enteroperitoneal in character, 17 were

hyperplastic, one with involvement of the sigmoid flexure. An interesting point about all these patients is that the ages noted were from 25 to 35, except four aged 43, 45, 19 and 17. This agrees with Hartman's description that the disease presents its maximum frequency between the ages of 20 and 40.

My own records suggest that the hyperplastic variety is not so entirely confined to the cæcum as the original description would suggest, and this is borne out by the brief notes of the other surgeons. The reason, of course, may be that our patients are seen at a later stage than in a more educated European community. In 6 patients the disease was entirely confined to the cæcum, in two there were scattered ulcers on the lower part of the ileum, and in two, in addition to ulcers on the ileum, there were miliary tubercles distributed over the peritoneum of the small intestine. In the patient on whom a cæcostomy was done, the tuberculous mass was entirely confined to the splenic flexure, but on account of his poor general condition and the presence of a sub-acute obstruction no radical treatment could be attempted. In only 3 of these 11 patients was there obvious disease in the lungs. Colonel Niblock reported 1 patient in the enteroperitoneal variety, on whom a lateral anastomosis was completed with complete success. A further operation was performed on this patient some months after the original one, and the tuberculous mass was found to be entirely healed, no evidence of tubercle remained.

Of my 11 patients one died 5 days after cæcostomy, another patient, with extensive disease in the lungs, died on the 5th day after an ileo-colostomy. Of the remaining 9 patients (excision of cæcum) seven left hospital with apparently an excellent result. All the 9 patients were discharged from the hospital, and we have been able to trace the after-history of 5 of them up to 2 years.

Case 1.—Male, aged 36. Tuberculous cæcum, enteroperitoneal. There were several scattered ulcers on the ileum and miliary tuberculous nodules on the peritoneum. Tuberculous infection present in both lungs. The chief signs were pain in the abdomen, chronic diarrhoea, and a tumour in the right iliac fossa.

Operation.—Excision of cæcum with lateral anastomosis. The patient developed a faecal fistula at the site of operation and was discharged with this still not healed. He died 6 months after operation as a result of general tuberculosis.

Case 2.—Female, aged 38. Had been treated at a sanatorium for tuberculosis of the lung with improvement. History of a hard, fixed mass in the right iliac fossa for several years. Lately she has been subject to attacks of pain which commenced 1½ hours after food and were relieved by vomiting.

Operation.—Excision of cæcum with lateral anastomosis of ileum to transverse colon. Hyperplastic disease of the cæcum, but the coils of the

ileum in the pelvis were studded with tubercles and matted together. The pathologist's report says that the ileo-cæcal valve was stenosed to almost complete obstruction by hyperplastic tuberculosis. Following the operation she had a severe broncho-pneumonia, which caused considerable anxiety for some time but eventually cleared. A fæcal fistula developed at the wound, but this healed with careful dressing 2 months after the operation. This patient is still at the sanatorium, 18 months after the operation. Her general condition is slowly improving but she still gets fever after over-exertion.

3. Remaining cases; girl, aged 20, man, aged 45, and girl, aged 18, with typical hyperplastic tuberculosis 2½, 2 and 1 year after the operation. They all appear to be in excellent health and free from tuberculosis.

The treatment of these forms of ileo-cæcal tuberculosis should be surgical; if seen at a reasonably early period, the results will be very satisfactory, and the dangers of the patient developing further tuberculous lesions remote. Simple laparotomy is, of course, useless, and short circuiting or ileo-cælostomy should be reserved for advanced degrees of the disease or for the entero-peritoneal variety which presents many difficulties, both on account of the adhesions in the abdomen, and the often extensive distribution of the tuberculous infection. Excision of the cæcum, including any involved area of ileum or ascending colon, is not a very difficult operation, and the divided ileum is joined either to the transverse colon or to the sigmoid loop. The average reported mortality from the operation varies from 12 to 25 per cent., and though we have had no mortality in our last 7 operations, 2 of these patients developed very alarming symptoms of severe toxæmia and were acutely ill for 48 hours. Handling of the tuberculous mass probably accounted for this condition, but recovery from the operation was otherwise very rapid and satisfactory. A two-stage operation does not appear to be necessary except for very feeble patients. Two of our patients developed fæcal fistulæ, an accident which I attribute to the drainage employed, and which I now endeavour, if possible, to avoid.

III. Two other unusual forms of abdominal tuberculosis in the period under review are worthy of note here. One patient with typical tuberculous ulcers in the upper part of the jejunum was operated upon under the mistaken diagnosis of duodenal ulcer. Another patient with symptoms mainly gastric was found to have a complete fibrous stricture at the ileo-cæcal valve. No evidence of tuberculosis could be found and the patient made a complete recovery after excision of the cæcum. We have not been able to trace the further history of this patient, but the condition as in 2 similar cases reported by Hartman, may have been tuberculous in origin.

I am indebted to Captain Bernard, Radiologist, Madras General Hospital, for photographs of

specimens which are preserved in the Medical College Museum.

REFERENCE.

Dr. Henri Hartman. *British Medical Journal*, April 1907.

SUB-PERIOSTEAL EXCISION OF JOINTS.

By H. HALLIWAY,

LIEUT.-COLONEL, I.M.S.

THE case, which is the text of this article, appears to be worthy of publication because it illustrates a principle and bears on a procedure on which surgical opinion is by no means unanimous.

Briefly the case history is as follows:—

The patient, a follower in the Mule Corps, was admitted to hospital as soon as he arrived in Bushire for an irreducible dislocation of the right elbow-joint, which he stated had occurred some six months before and three months previous to his enlistment. It was towards the end of the Great War, and in the dearth of men then prevailing, medical officers did not scrutinise the physical defects of recruits too closely. At any rate this man had been enlisted with an irreducible dislocation of the right elbow-joint, and his martial ardour having subsided by the time of his arrival in the Gulf, he recognised in his disability the finger of Providence, and sought an asylum in the nearest hospital.



Fig. 1.

The first skiagram shows a fracture-dislocation of the right elbow-joint, the articular surfaces being rotated forward.

Reduction being out of the question, it was considered that an excision would give him the best chance of a useful limb.

A sub-periosteal resection with a very sharp rugine was done on the 18th December, 1918. Kocher's incision was used. No soft parts were sacrificed, and the whole apparatus of the joint was left intact.

Indeed it was very difficult for visitors to whom this case was shown to believe that an excision had been done, so complete was the restoration of form and function.

The interest of the case, however, lies not so much in the result as in the principle which it illustrates, viz., that the regeneration of a joint is possible after an excision providing that the excision is done with a sharp rugine, so that the



Fig. 2.

Skiagram No. 2 shows the condition of the limb the day after the operation and the extent of bony removal. The limb was put up on a hinged splint which was discarded after a month.

Another skiagram, taken one month after the operation, showed an abundant growth of new bone, the new bone being laid down in such a manner as to replace the old bone which was removed in the excision.

Skiagram No. 3, taken six weeks after the operation, shows the restoration of the contours of the joint, the restoration of the ulnar process and of the internal and external condyles. As the callus was young, it did not throw a dense shadow, but the deposit of new bone was easily perceptible to touch, and the restoration of the olecranon process and of the condyles was complete.

All movements were completely restored and he obtained a very strong and stable joint.



Fig. 3.

cambium layer of the bone is raised with the periosteum.

The patient was a man of 27 years of age, so that the result appears to be in direct contradiction of Ollier's well known dictum that after sub-periosteal resection (of a joint) in an adult no new bone is formed.

Generations of medical students had been taught that it was to the periosteum that the regeneration of bone was to be attributed; and it was not until 1911 when McEwan's epoch-making communication came very much like a bolt from the blue that the comfortable and somewhat uncritical acquiescence of the profession in the older view was rudely shaken.

McEwan set out to prove that the periosteum takes no part in the regeneration of bone; far from it, its functions are entirely those of a limiting membrane.

He devised a number of ingenious experiments to show that the regeneration of bone is effected by bone alone. He even repeated Duhamel's ring experiment, with this modification that he first removed the periosteum, yet the ring became embedded in the shaft of the bone exactly as in Duhamel's experiment. Duhamel buried his ring *under* the periosteum, and when it became buried in bone he inferred that this growth of bone took place from the periosteum.

The undeniable clinical fact that in many cases when osteomyelitis occurs in the shaft of a long bone a sheath of new bone is laid down about the necrosed shaft, he explained by assuming that osteoblasts are carried out along the Haversian canals into the loose areolar tissue beneath the periosteum, and it is from these cells that the new bone is laid down.

When McEwan, nearly 45 years ago, built up the shaft of a boy's humerus by filling it in with wedge-shaped fragments obtained from osteotomies, he made a brilliant contribution to operative surgery and started surgeons on the road which has led to the achievements in bone grafting which are common-places to-day; but in his anxiety to impress the importance and true inner meaning of his discovery upon the surgical opinion of his time he was led, I think, into relegating the share taken by the periosteum in bone repair into an unfairly subordinate position.

It is not, I believe, generally known that some recent advances in the treatment of bone defects were anticipated by a Central Asian surgeon nearly 400 years ago. When the Emperor Baber was wounded in his retreat from Andejan by an arrow in the thigh, his uncle, the Khan, sent his own surgeon to examine the wound. I quote the Emperor's own words:—"To the wound in my thigh he applied the skin of some fruit which he had prepared and dried, and did not insert a seton. He told me that a man once had the bone of his leg broken in such a manner that a part of the bone, the size of a man's hand, was completely shattered to pieces. He cut open the integuments, extracted the whole of the shattered bone and inserted in its place a pulverised preparation; the preparation grew in the place of the bone, and became bone itself, and the leg was perfectly cured."

The Khan's surgeon does not say what the pulverised preparation was, but probably regeneration of the shaft took place from the periosteum or from the osteoblasts which were lifted with the "integuments."

Whether the new bone, which in certain circumstances is admittedly laid down by periosteum as in the case of the massive necrosis of a long bone, is derived from the periosteum or is developed from true bone cells fortuitously entangled in the deeper layers of the periosteum appears to be a matter of purely academic interest; a far more momentous issue is the capacity of the periosteum to regenerate the shaft of a long bone,

providing a special operative technique be adhered to.

How any one can doubt this who has read the works of Leriche and carefully studied his illustrations, it is difficult to understand, yet we are still treated to solemn warnings against the dangers of sub-periosteal removal of bone and the incapacity of the periosteum to regenerate fresh bone.

The worst of a negative injunction of this kind, presumably founded on a disastrous experience, is that if the experience is personal it must of necessity be a very limited one; it is difficult to believe that the surgeon persisted in a line of treatment which resulted in a succession of flail-joints and ununited fractures.

The burden of proof lies on the prosecution.

As Leriche himself says, "On this pitiful evidence it is decided that the sub-periosteal removal of fragments is useless. Need one point out the worthlessness of these careless conclusions? What is known of the conditions under which the operations were performed?"

On the other hand, the defenders of the theory can supply an abundance of clinical evidence that the periosteum properly elevated can re-constitute the shaft of a long bone.

What the disciples of the Lyons school claim is not unreasonable. They assert that if care be taken to raise with the periosteum sufficient cells of the cambium layer of the bone, these cells, placed in optimum conditions as regards site and nutrition, are capable of growth and survival.

To deny them this would be to condemn all bone grafting procedures as futile; if a cell will not survive under these very favourable conditions, it would be even less likely to do so when cut off from its normal blood supply.

If, in Sir Arbuthnot Lane's graphic and arresting phrase, the bony skeleton is nothing more than the crystallisation of lines of force, then the re-constitution of a bone in the manner described is not a matter for astonishment, for the same lines of force which determined the contours of the original bone will mould the growing cells into the same forms again.

Technique.—The best pattern of rugine for the purpose is Ollier's. Messrs. Down Bros. have made me a very excellent modification of Ollier's original pattern with a special long shaft and a finger rest and guard. The edge, of course, should be as sharp as a razor.

These rugines were copied from a modification of Ollier's original pattern devised by Major Pierpoint, I.M.S., at the Indian War Hospital, Ambala.

The whole secret of the technique lies in the use of a rugine with a razor-like edge, which must be applied very firmly to the bone, as it is essential that a sufficient supply of osteoblasts from the cambium layer of the bone be elevated with the periosteum.

An incision is made which will inflict the minimum of damage to the soft parts of the joint, and once this incision has been made the knife is laid down and the rugine is the sole instrument used.

The bones are denuded of periosteum up to the limit of what is to be removed, all ligaments, muscular attachments, etc., being elevated with the periosteum.

The articular ends of the bone are then sawn off and the resulting cavity packed with sterile gauze. The limb is then put up on a hinged splint and passive movements commenced on the third day.

As a rule, no sutures are used, the gauze is changed on the second day and discontinued after a week.

A NOTE ON THE DISINFESTATION OF HOUSES BY FUMIGATION WITH CRESOL.

By R. B. LAL, M.B., B.S., D.P.H., D.T.M. & H.,
and

C. D. TIWARI, M.D., B.S., D.P.H.

(From the Epidemiological Bureau, Punjab.)

THE method of disinfestation of houses for plague in vogue in the Punjab since 1915 is by vaporising commercial cresol on smouldering cow-dung cakes. Colonel Lane in a note on flea-destruction (1915) recommends two ounces of cresol for this purpose.

Under instructions from the Director of Public Health, Punjab, an enquiry on the efficacy of this procedure was undertaken in August last year.

The points studied by us were:—

(1) The effects of fumigation of varying amounts of cresol on rats and rat fleas in *pacca* (masonry) and *kachlia* (mud, etc.) houses; the fleas being:—

(a) in muslin bags

(I) directly exposed to the vapour; and

(II) more or less protected in various ways:

(b) on living rats,

(c) free in the room.

Experiments in Pacca Houses.—For this purpose two brick-built rooms of equal dimensions and of the same shape were selected in a residential house. The cubic capacity of each of these rooms was 1,488 cubic feet (124 square feet floor by 12 feet). They were well ventilated and well lighted. There was no dampness. The floor was made of brick-tiles without any cracks or holes and the walls were plastered and lime washed.

Fleas were caught quite uninjured in the following manner:—

A thick layer of freshly carded cotton-wool was spread on a small table. The fleas were collected in small test tubes directly from the fur,

while an assistant held the rat by the lower portion of its body and ears. Some fleas jumped on to the cotton-wool; these were picked up with forceps.

The general plan of these experiments was as follows:—

Free fleas, fleas in muslin bags (without folds), and rats with fleas on their bodies in Chitré pattern rat-traps were placed in various positions in the room according to the requirements of the experiments. Thus free fleas were placed—

(a) on the floor, directly exposed to the vapour;

(b) behind household furniture such as a log of wood, a *chakki*, a box, etc.; and

(c) in the folds of a *razai* (Indian cotton quilt).

Fleas in muslin bags were put—

(a) on the floor;

(b) in a rat run about 2 to 3 inches from the opening;

(c) in the folds of a *razai*; and

(d) behind the furniture.

The rat-traps were placed—

(a) on the floor;

(b) about 6 feet above the floor; and

(c) near the roof.

Messrs. Smith, Stanistreet and Co.'s brand of cresol was used throughout. On analysis it was found to be derived from fairly light oils and its phenol content was 44.5 per cent.

The rats employed were of the variety *Rattus rattus*.

All the openings were carefully closed. Wet and dry bulb thermometers were placed against a window-pane some time before the commencement of the experiment. The temperature having been noted, a variable amount of cresol was poured directly on to $1\frac{1}{2}$ seers of smouldering cow-dung cakes in an iron pan (*tasla*). The room was then sealed and kept closed for four hours in all cases. Looking through the window-pane the readings of the thermometers were recorded every half hour. On re-opening the room the condition of the fleas and rats was noted. Except in the case of the first four experiments, the fleas were kept overnight at room temperature and re-examined next morning to confirm the results of the previous day, for it was found that some of the apparently dead fleas were apt to revive.

In six experiments, Nos. 29, 30, 31, 32, 33 and 34 (using 4, 6, 8, 10 and 12 ounces of cresol) a sheet of cloth was stretched across the room at a height of $4\frac{1}{2}$ ft. in order to prevent the vapour from rising directly high up.

In nine experiments with 10 and 12 ounces of cresol the drug was distributed over two heaps of $1\frac{1}{2}$ seers of smouldering cow-dung cakes instead of one such heap.

Some preliminary experiments had shown that the fleas could live in muslin bags at room-temperature for at least 24 hours.

It was also ascertained that 4 ozs. of cresol took 40 minutes to vaporise completely when poured over $1\frac{1}{2}$ seers of smouldering cow-dung cakes. In view of this fact a uniform period of 4 hours was considered reasonable and convenient.

The summary of the experiments in *pacca* rooms is given in Table I.

Discussion of Results.—It will be seen that:—

(1) The rats remained unaffected, even with 12 ounces of cresol.

(2) Cresol vapour was definitely toxic to the fleas; 4 ounces were sufficient to effect the death of fleas in muslin bags placed 2 or 3 feet or more above the floor, but this quantity was

TABLE I.
Summary of Experiments in Pacca Rooms.

| Experiment No. | Ounces of cresol. | TEMPERATURE. | | | POSITION OF MUSLIN BAGS CONTAINING FLEAS. | | | | | | FREE FLEAS. | | FLEAS ON RATS. | | | REMARKS. |
|----------------|-------------------|--------------------------|--------------------|--------|---|-------------------|-----------------------------|---------------|------------------|----------------|--------------|----------------------|----------------|------------------|----------------|---|
| | | Beginning of experiment. | End of experiment. | Range. | On the floor unprotected. | Behind furniture. | Protected by <i>razai</i> . | In a rat run. | Above the floor. | Near the roof. | Unprotected. | Protected. | On the floor. | Above the floor. | Near the roof. | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | |
| 3 | 2 | .. | .. | .. | .. | ± | .. | .. | .. | .. | .. | .. | ? | ? | .. | Door slightly open. |
| 2 | 3 | .. | .. | .. | .. | ± | .. | .. | .. | .. | .. | .. | ? | ? | .. | |
| 1 | 4 | .. | .. | .. | .. | .. | .. | .. | 3 ft+ | .. | .. | .. | +fl | 6 ft+fl | .. | |
| 4 | 4 | .. | .. | .. | .. | .. | .. | .. | 3 ft+ | .. | .. | .. | ±fl | 6 ft+fl | .. | |
| 5 | 4 | 89 | 86 | 3 | .. | ± | .. | .. | 2 ft+ | .. | .. | .. | +fl | 10 ft+fl | .. | Door slightly open. |
| 14 | 4 | 85 | 88 | 3 | ± | .. | .. | .. | .. | + | .. | .. | —f | .. | ±fl | |
| *29 | 4 | .. | .. | .. | ± | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | |
| @35 | 4 | .. | .. | .. | ± | .. | .. | .. | .. | + | + | box ± <i>razai</i> — | .. | .. | .. | |
| @36 | 4 | .. | .. | .. | ± | .. | .. | .. | .. | + | + | box ± <i>razai</i> — | .. | .. | .. | |
| 15 | 5 | 84 | 89 | 5 | ± | .. | .. | .. | .. | + | .. | .. | ±f | .. | ±fl | |
| 6 | 6 | 84 | 86 | 3 | .. | .. | .. | .. | .. | + | .. | .. | ±fl | 10 ft±fl | ±fl | |
| 16 | 6 | 86 | 88 | 2 | + | .. | .. | .. | .. | + | .. | .. | ±f | .. | ±fl | |
| *30 | 6 | .. | .. | .. | + | .. | .. | .. | .. | .. | .. | .. | ±f | .. | .. | |
| 17 | 7 | 86 | 88 | 2 | + | .. | .. | .. | .. | + | .. | .. | ±f | .. | ± | |
| 7 | 8 | 84 | 88 | 4 | .. | ± | .. | .. | .. | + | .. | .. | + | 10 ft+fl | .. | |
| 18 | 8 | 87 | 89 | 2 | + | .. | .. | .. | .. | + | .. | .. | +? | .. | +fl | |
| *31 | 8 | .. | .. | .. | + | .. | .. | + | .. | .. | .. | .. | ±fl | .. | ±fl | |
| 8 | 9 | 86 | 88 | 4 | .. | ± | .. | .. | .. | .. | .. | .. | ±fl | .. | ±fl | |
| 19 | 9 | 87 | 88 | 2 | + | .. | .. | + | .. | + | .. | .. | +fl | .. | +fl | |
| 9 | 10 | 88 | 88 | 2 | .. | + | .. | .. | .. | + | .. | .. | ±fl | .. | ±fl? | |
| 10 | 5+5 | 89 | 93 | 4 | .. | + | .. | .. | 2½ ft | + | .. | .. | ±fl | 2½ ft+fl | +fl | Door slightly open. |
| 11 | 5+5 | 86 | 92 | 7 | .. | + | + | .. | .. | .. | .. | .. | +fl | .. | .. | |
| 12 | 5+5 | 85 | 89 | 8 | + | .. | .. | .. | .. | + | + | + | .. | .. | .. | |
| 20 | 5+5 | 89 | 90 | 3 | + | .. | .. | + | .. | + | .. | .. | .. | .. | .. | |
| 21 | 5+5 | 88 | 89 | 3 | ± | .. | .. | ± | .. | ± | .. | .. | .. | .. | .. | |
| 22 | 5+5 | 86 | 90 | 7 | + | .. | .. | + | .. | + | .. | .. | fl | .. | +fl | |
| 23 | 5+5 | 87 | 89 | 8 | + | .. | .. | + | .. | + | .. | .. | +fl | .. | +fl | Controls. No cresol used, only 1½ seers smouldering cow-dung cakes. |
| *32 | 10 | .. | .. | .. | + | .. | .. | + | .. | .. | .. | .. | .. | .. | .. | |
| 13 | 6+6 | 83 | 91 | 9 | + | .. | .. | .. | .. | + | + | + | .. | .. | .. | |
| *33 | 12 | .. | .. | .. | + | .. | .. | + | .. | .. | .. | .. | .. | .. | .. | |
| *34 | 10 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | |
| 37 | 0 | .. | .. | .. | .. | .. | .. | .. | 3 ft— | .. | .. | .. | —f | 6 ft—f | .. | |
| 38 | 0 | 89 | 86 | 3 | .. | .. | .. | .. | 3 ft— | .. | .. | .. | —f | .. | .. | |

Explanation of signs used in the Table:—

Sign + indicates that the fleas all died.

Sign — indicates that the fleas were all living.

Sign ± indicates that some fleas were living and some dead.

Sign * indicates those experiments in which a sheet of cloth was stretched across the room 4½ ft. above the floor.

Sign @ indicates experiments in which in addition to cresol, sulphur ½ lb. and Sarson oil 2 ozs. were used.

Sign f indicates that the fleas did not leave the rat, and fl indicates that they left the rat.

Cresol was divided into two equal parts, in experiments in which in column 2 it is shown as such, as in experiments Nos. 10, 11 and 12, etc.

Sign .. indicates that that part of the experiment was not done.

Sign ? indicates that some fleas or all the fleas were not recovered.

insufficient to effect the death of fleas at floor level, and 6 ounces were required for this purpose.

(3) In traps placed on the floor, 8 ounces of cresol caused the fleas to leave the body of the rat completely, while only 4 ounces sufficed to make the fleas leave the rat when the traps were hung up 6 feet or more above floor level.

(4) While 6 ounces of cresol were sufficient to kill the fleas in muslin bags on the floor when directly exposed to the vapour, as much as 10 ounces were required to destroy them when the bags or free fleas were placed behind a box, a *chakki* or a log of wood, and even this quantity was not always successful when the bags were placed 2 or 3 inches inside a rat run. In the folds of a *rasai* free fleas or fleas in muslin bags were not killed, even when as much as 12 ounces of cresol was used.

(5) Mere smoke of cow-dung cakes without cresol does not affect the fleas or rats.

(6) The temperature during our enquiry ranged between 84°F. and 93°F. and the maximum variation of temperature during the course of any individual experiment was 9°F. Temperature within these limits does not seem to play any important part.

(7) Fleas in muslin bags placed in rat runs were more readily killed in experiments in which a sheet of cloth was stretched across the room than in other experiments with the same amount of cresol.

(8) Slightly better results were obtained by fumigation when any given quantity of cresol was vaporised in equal parts on two heaps of

cow-dung cakes than when the whole amount was vaporised on one heap.

(9) In two cases in which the doors were not perfectly closed, the efficacy of fumigation was distinctly reduced.

(10) Washing the floor with phenyl lotion killed the fleas on the floor.

Experiments in Kachha Houses.—For the first of these experiments two *kachha* rooms in a residential house were employed. The cubic capacity of each of these rooms was 1,300 cubic feet. The floor was unpaved but smooth and plastered with cow-dung and clay. They were full of typical household furniture and sundries like a *chakki*, a *charpai*, piles of earthenware pots, etc. There were some natural rat runs which were not closed. The walls presented an unbroken surface of plastered clay. The ceiling consisted of *sirkis* supported on rafters. Unfortunately, these rooms were not available for all the experiments and resource had to be made to somewhat less typical *kachha* rooms in a *zail-ghar*, when two rooms each of 10 feet by 10 feet by 10 feet were used. In this case the floor was unpaved, dusty, slightly broken in parts and not plastered with cow-dung. The walls were like the floor, with some peg holes. The ceiling consisted of bricks supported on wooden beams. They were fairly well lighted and ventilated.

The general plan of experiments was exactly the same as in the case of *pacca* rooms.

Here eleven experiments and one "control" experiment, using cow-dung cakes without cresol, were conducted. The summary of these experiments is given in Table II.

TABLE II.
Summary of Experiments in Kachha Rooms.

| Experiment No. | Ounces of cresol. | TEMPERATURE. | | | POSITION OF MUSLIN BAGS CONTAINING FLEAS. | | | | | FREE FLEAS. | | FLEAS ON RATS. | | | REMARKS. |
|----------------|-------------------|--------------------------|--------------------|--------|---|-------------------|--|---------------|----------------|--------------|------------|----------------|------------------|----------------|----------|
| | | Beginning of experiment. | End of experiment. | Range. | On the floor, unprotected. | Behind furniture. | Protected by <i>rasai</i> or cotton quilt. | In a rat run. | Near the roof. | Unprotected. | Protected. | On the floor. | Above the floor. | Near the roof. | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | |
| 1 | 4 | 88 | 90 | 6 | .. | — | — | .. | .. | .. | .. | -f | .. | ±f | |
| 2 | 4 | 95 | 95 | 0 | — | .. | .. | .. | + | .. | .. | -f | .. | .. | |
| 3 | 5 | 95 | 95 | 0 | — | .. | .. | .. | + | .. | .. | -f | .. | .. | |
| 4 | 6 | 87 | 92 | 5 | ± | .. | .. | ± | .. | .. | .. | -f | .. | .. | |
| 5 | 7 | 89 | 92 | 3 | ± | .. | .. | ± | .. | .. | .. | -f | .. | .. | |
| 6 | 8 | 88 | 91 | 3 | + | .. | .. | ± | .. | .. | .. | -f | .. | .. | |
| 7 | 9 | 89 | 92 | 3 | + | .. | .. | ± | .. | .. | .. | ±f | .. | .. | |
| 8 | 10 | .. | .. | .. | + | .. | .. | ± | .. | .. | .. | ±f | .. | .. | |
| 10 | 10 | .. | .. | .. | .. | .. | .. | + | .. | .. | .. | ?f | .. | .. | |
| 11 | 10 | .. | .. | .. | .. | .. | .. | + | .. | ± | .. | .. | .. | .. | |
| 9 | 11 | .. | .. | .. | .. | .. | — | + | .. | ?+ | ?+ | .. | .. | .. | |

Explanation of signs :—As for experiments in *pacca* rooms, i.e., Table I.

TABLE III.

Summary of Experiments with Izal in Pacca Rooms.

| Experiment No. | Ounces of izal. | TEMPERATURE. | | | POSITION OF MUSLIN BAGS CONTAINING FLEAS. | | | | | | FREE FLEAS. | | FLEAS ON RATS. | | | REMARKS. |
|----------------|-----------------|--------------------------|--------------------|--------|---|-------------------|---------------------|---------------|------------------|----------------|--------------|------------|----------------|------------------|----------------|----------|
| | | Beginning of experiment. | End of experiment. | Range. | On the floor, unprotected. | Behind furniture. | Protected by razal. | In a rat run. | Above the floor. | Near the roof. | Unprotected. | Protected. | On the floor. | Above the floor. | Near the roof. | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | |
| 24 | 6 | 82 | 86 | 4 | — | .. | — | — | ± | ± | .. | .. | ± f | .. | + | |
| 25 | 8 | 82 | 86 | 7 | ± | .. | — | — | ± | ± | .. | .. | ± f | .. | + fl | |
| 26 | 10 | 79 | 86 | 12 | + | .. | — | — | ± | + | .. | .. | ± fl | .. | + fl | |
| 27 | 12 | 80 | 85 | 13 | + | .. | — | — | ± | + | .. | .. | ± fl | .. | + fl | |
| 28 | 7+7 | 80 | 84 | 10 | + | .. | — | — | ± | + | .. | .. | + fl | .. | + fl | |

Summary of Experiments with Izal in Kachha Rooms.

| | | | | | | | | | | | | | | | | |
|----|----|----|----|---|---|----|---|---|----|---|----|----|------|----|------|--|
| 12 | 4 | 82 | 83 | 1 | + | .. | — | — | .. | + | .. | .. | ± f | .. | + fl | |
| 13 | 5 | 82 | 84 | 2 | + | .. | — | — | .. | + | .. | .. | ± f | .. | + fl | |
| 14 | 6 | 82 | 82 | 0 | + | .. | — | — | .. | + | .. | .. | ± f | .. | + fl | |
| 15 | 7 | 75 | 79 | 4 | + | .. | — | — | .. | + | .. | .. | + fl | .. | + fl | |
| 16 | 8 | 76 | 77 | 1 | + | .. | — | — | .. | + | .. | .. | + fl | .. | + fl | |
| 17 | 9 | 71 | 76 | 3 | + | .. | — | — | .. | + | .. | .. | ? | .. | .. | |
| 18 | 10 | 71 | 77 | 6 | + | .. | — | — | .. | + | .. | .. | + fl | .. | + fl | |

Explanation of signs used in the table :—As for experiments in *pacca* rooms, i.e., Table I.

Discussion of Results.—The results of the two series in *pacca* and *kachha* houses are not strictly comparable, but they are more or less similar.

(1) The rats remained unaffected even with the highest amount of cresol, viz., 11 ounces.

(2) To kill the fleas near the roof 4 ounces were sufficient, while 6 ounces were required to kill them on the floor. In one experiment there was evidence to show that some of the free fleas left on the floor escaped destruction even when 10 ounces of cresol were used.

(3) In traps placed on the floor, 10 ounces of cresol were required to make the rat free of fleas.

(4) Ten ounces of cresol killed the fleas in muslin bags placed two inches inside a rat run.

CONCLUSIONS.

1. Cresol fumigation as ordinarily carried out has no action on rats, but has a definite toxic action on rat fleas in muslin bags, free in the room, or on the bodies of the rats, but the quantity recommended by Colonel Lane, viz., 2 ounces, is quite insufficient for ordinary rooms of 1,000 to 1,500 cubic feet capacity.

2. Household furniture and rat runs afford effective protection to the fleas against the action of the vapour, even when the drug be used in large quantities.

3. Fumigation with cresol tends to cause fleas to leave their host.

4. The toxic action of cresol vapour is more manifest at higher levels as compared with the floor level.

5. Slightly better results are obtained by vapourising cresol on two heaps of smouldering cow-dung cakes instead of on one.

Recommendations.—To make the disinfection by cresol effective:—

1. Remove all the furniture and sundries before disinfection, and thoroughly expose them to the sun.

2. Use 10 ounces of cresol in an ordinary room of 1,000 cubic feet capacity.

3. Preferably distribute the drug over two iron pans containing smouldering cow-dung cakes placed in different parts of the room.

4. It is expedient to arrange some mechanical means for preventing the vapour from directly rising up.

5. It is necessary to seal the room carefully before fumigation, and to keep it closed for four hours afterwards.

6. It is expedient to wash the floor with phenyl lotion after the disinfection is over.

7. After disinfection is complete, rat runs should be fumigated with neem-cartridges and then closed.

It is recognised that without the help of the usual staff and under the rural conditions in the Punjab it would not be always possible to carry out these recommendations, and the value of this procedure is, therefore, limited.

YAWS (FRAMBOESIA) IN THE CHIN HILLS.

By P. BELL, I.M.D.,
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LIKE many other diseases, yaws is a disease that occurs in certain districts. Its ætiology need not be repeated here, as books already exist where the subject may be studied, for instance, Spittels' "Framboesia Tropica." What I wish to point out here, is, when any suspicion of an unfamiliar disease is met with, it will probably be of benefit both to the medical profession and to the patients themselves, if this suspicion is examined, until results show one that the suspicion bears fruit or is groundless.

On arrival in the Chin Hills, I noticed that a certain class of cases occurring up to the latter part of 1923 (three months before my arrival), were being classified as "syphilis." Several were treated in the out-patient department, but as the custom of the Chins is to take medicine only when they visit headquarters on business, these out-patients are lost trace of, unless they return for treatment when visiting headquarters again. This may mean a long time, perhaps, a month or more. Taking this into consideration, I have not tried to include these cases. But, as with the in-patients, their symptoms and history in all cases have been similar.

It may be of advantage to give the usual symptoms of syphilis as met with in every-day practice and against them the symptoms met with in the cases here described. At a glance one sees the difference and concludes that a microscopical examination is unnecessary.

SYPHILIS.

CASES TREATED IN FALAM.

- (1) Primary infection in almost all cases genital, extra-genital cases are rare.
- (a) Angle of the mouth affecting the junction of mucous membrane, and skin not hard indurated, or large, more like a chap or like a cracked lip.
- (b) Margin of anus, starting as a pimple and taking on a condylomatous appearance.
- (c) Some cases do get it near the genitals, some on the genitals. I have not seen one case of vaginal sore; they are always on the labia majora or sometimes mimora. In the male the groin is usually affected. In a few cases the patient has a sore on the foreskin or glans but these are like a soft sore.

In the great majority of cases though, the onset is ascribed to the anus, next the mouth then other parts. The Chin is simple-minded and even their woman folk readily show all affected parts without any pretence of being shy. Their re-

SYPHILIS.

CASES TREATED IN FALAM.

plies are usually straightforward when denying infection through immorality.

- (2) Secondary rash. (2) Not met with; though a child had a rash all over the abdomen.

In some places it looked like a secondary rash. Taking the child's age into consideration, i.e., 2 years, it was not a case of congenital syphilis, as we know this shows within six months of birth, if the child is not born with symptoms of the disease. Was it acquired? The only means of infection, that I can suggest is through suckling. The mother's disease was more like yaws than syphilis.

- (3) Iritis. One is familiar with the blindness met with in Burma; many of these cases can be traced to syphilis. Why, is the Chin exempted? (3) Nil, not seen in a single case.

- (4) Teeth affected. (4) Not seen in a single case.

- (5) Itchiness. (5) In some cases the patients did complain of itchiness but the Chin's habits are very dirty and they never wash. This may be the cause of itchiness in these few cases more than the disease.

- (6) Bone affected. (6) Not seen in any of the cases.

- (7) Gumma. (7) Not met with.

- (8) Other rarer symptoms as paralysis, etc. (8) Not met with.

- (9) Infection not due to dirty habits and surroundings but to personal contact, i.e., coitus. (9) Cases Nos. 2, 8, 11, 12, 15, 16, 17 and 23 were not contacts. The Chins are unclean personally. Some I am told never wash their hands or faces. They eat anything, i.e., dogs, rats, etc. The meat is usually partially cooked. They eat raw flesh as well. It is interesting to note that intestinal worms are common among them.

Their homes and surroundings are filthy; being spirit worshippers, advice and medicine is usually a failure with them. They are now responding to treatment after seeing the benefit that some of the cases have received after N.A.B. treatment.

- (10) Secondary symptoms very often ushered in with an attack of fever. (10) Only one patient gave a history of fever.

The spirochaetes, described in text-books, are really meant for the expert and I must confess that I have failed to demonstrate the spirochaete.

of yaws in some of these cases from which I took scrapings, using Geimsa's stain. I will confine myself to the clinical diagnosis and leave it to the reader to agree with me or not. After perusal of these notes one wonders if the two cases described in the *Indian Medical Gazette* of December, 1923, by Captain Shah, I.M.S., as primary extra-genital chancre could have been yaws. I do not say his diagnosis was at fault, but on seeing so many extra-genital cases in the Chin Hills, it struck me as being peculiar, though the ulcer on the woman's mouth does not look exactly like those met with in the Chin Hills.

A Typical Case.—Onset usually a small pimple at the margin of the anus, which bursts, spreads and eventually involves the groin or private parts, some cases starting in the groin and on the labia majora. Some cases start with an ulcer as already described at the angle of the mouth. Two women stated that their breasts were affected first. No history of primary sore; sometimes whole families are affected. Males, females, and children appear to be affected equally, though females mostly apply for treatment. This, I think, is due to the Chin being exclusively a cultivator and a very poor one at that. Their produce is of the poorest of the poor, and hence they must work hard for a living; the males even when very ill have to carry on somehow for a living. The importance of this relating to treatment will be seen later. On glancing through the cases, here described, we notice the following:—

(1) The typical ulcer, as noted in text-books, "encrusted ulcer" is not always seen. They were seen in 4 cases only out of 23.

(2) The 2 cases of infection of the breast, stated to be the primary lesion, were mothers suckling children about 2 years of age. The lesion may have started as a bite from the child as the part affected was situated about where the child's teeth would be when suckling. The wound touched by the dirty hands of a crawling child may have supplied the infection. The Chin woman suckles her child till late. I have seen children of 2½ or 3 years of age being suckled.

(3) Ulcers at angle of mouth; these, like the affection of the anus, are almost constant. One angle of the mouth in affected, just a patch about ¼ in. to ¾ in. in diameter, like a patch of stomatitis but not so white. These patches are very stubborn and are usually the last to yield to treatment.

(4) In 1 case part of the eruption looked like a syphilitic eruption, but the child was 2 years of age and as remarked above could only have acquired it through its mother.

(5) One case shewed ulcers of the groin. I saw similar cases to this in the out-patient department. It is curious to note that the men usually suffer at this place, whereas the women mostly on the labia majora or anus.

(6) The ulcers round the anus in all instances have the same history. In appearance they can-

not be distinguished from a condyloma, and affection on one side usually extends to the opposite side by contact. This is most constant in the cases that apply for treatment. Seen in 14 cases.

(7) In 2 cases the eyelids were affected for the most part, the upper lids shewing the appearance of an eczema, scaly, like psoriasis. Both cases did very well under treatment. Though the eyelids were badly infected, it is interesting to note that the eyes remained unaffected.

(8) In 1 case the typical horny-like yaws, as described in text-books was seen. Two cases had ulcers of the soles of the feet. They had passed the horny stage and had large sloughing ulcers on admission, which were still very painful but not as painful as before ulceration began. This is typical of yaws.

(9) Family history, etc. In all cases syphilis was denied. The patients are not shy to answer questions and willingly show the affected parts; as a rule, a younger sister or someone in the family is affected. Three cases were all unmarried and all virgins. One patient stated that her younger sister was affected and another had two brothers infected; their parents were free. Some of the villages round about Falam are supposed to be heavily infected, especially a village called Hairon.

(10) The disease appears to hang on for years. One case was of 2 years' duration. Still graver symptoms than those described are not met with.

(11) In all cases the patients were treated with novarsenobillon diluted with sterilized distilled water, direct into the vein with a 10 c.c. syringe, and without exception all improved almost immediately after treatment. Mercury was also used. But the beneficial change was always noted after the novarsenobillon treatment and they appear to appreciate the treatment. It is hoped that the news will spread sufficiently to afford help to these poor ignorant people.

(12) We are well aware of the fact that treatment of both diseases is the same. From a moral point of view the 2 diseases should be differentiated, where possible, and handled with intelligence. In conclusion, I wish to refer to 2 cases of male patients admitted to hospital for treatment.

Case No. 1.—Chin male, aged 35, was admitted for treatment of the following:—

(a) Of primary importance to the patient was a large sloughing irregular ulcer with raised margins, parts of which had a warty appearance, parts undermined with pus covered with small scabs, the centre had several raised warty looking growths on it with others surrounding the ulcer, situated on the inner side of the right ankle, extending back to the heel and tendo Achillis, and forward just beyond the middle line, upwards about 3 finger-breadths above the malleolus, and downwards to the junction of the sole of the foot. The patient was unable to walk from severe pain, and had in addition a constant weeping condition of the part.

(b) Warty growths on the forehead, around the nostrils, and mouth and at the outer angle of the right eye. Ulcers in nostrils.

(c) Elevated ulcers with pus and scabs on the wrists, forearms and face.

(d) Ulceration of fauces, especially on the left side.

(e) Ulcer at tip of tongue, under surface.

(f) Warty patches in the right axilla.

(g) Ulcers on the foreskin with a whitish discharge.

He was unable to pull back his foreskin. The discharge did not contain gonococci. His features were slightly bloated and his conjunctivæ were injected. He was in great pain at the time of admission. Positively denied having contracted syphilis and stated that his wife was not infected. The leg was dressed and I gave him tincture iodine m. vi. intravenously, repeated the next day with m. vi. for experimental purposes. As there was no immediate result and being quite positive that the case was one of syphilis, I next gave him an intravenous injection of novarsenobillon. The pain in his leg subsided altogether and the part dried up. He was doing well. The condition of the tongue, angle of eye, nostrils and mouth were rapidly cleaning up. Unfortunately for him, his father came to hospital and took him home, because his wife was about to be confined and he had to perform some religious ceremonies, and could not be left in hospital until completely cured. This case I believe was one of syphilis and not of yaws.

Case No. 2.—Chin male, 56 years of age, a sturdy old man and in good health except for an enlarged right knee for which he sought treatment. Duration 6 months. Had marks of blistering, etc. Very good movement in the joint. No riding of the patella. Inflammation of inner part and below patella mostly. Knee much larger than the left one. Shiny appearance, most painful on the inner side. I ran a 10 c.c. needle into the most painful part but nothing came away, not even fluid. I then aspirated below the patella with no result. He gave a history of syphilis many years before. On examining his penis for marks of sore, I noticed that the whole of the tip of the foreskin had the appearance of a fairly recent infection. Like all other Chins, he left hospital before being completely cured.

Since writing this article, there have been several admissions to hospital for similar cases and several relapses.

REPORT ON A VISIT TO THE LEPER ISLAND OF CULION AND ON THE ANTI-LEPROSY WORK IN THE PHILIPPINE ISLANDS.

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THE anti-leprosy work which has been carried out in the Philippine Islands during the last 19 years is valuable not only for what it has done to stamp the disease out of these islands, but also for the stimulus which it has given to similar work in India and in other parts of the world. It was, therefore, with keen expectation that I looked forward to my visit to the leper island of Culion.

The Americans, on their occupation of the Philippine Islands, noticed the large numbers of lepers frequenting public places and engaged in occupations which rendered them a danger to the general community, and it was determined in

1906 to remove this menace by the deportation of all bacteriologically positive lepers to Culion, an island some 200 miles to the S. W. of Manila.

This policy has been carried out for the last 19 years, and those engaged in anti-leprosy work in the Philippines are of the opinion that, while the ardent expectations of some of those who initiated the work have not been fulfilled in reducing leprosy to negligible proportions, the results have justified the steps taken in the very considerable reduction of its prevalence.

As my experience in anti-leprosy work has been almost entirely confined to India, this report will take the form of a comparison of conditions connected with leprosy in India with the corresponding conditions in the Philippines, as far as I was able to become acquainted with them during my very short visit.

There are 11 million inhabitants of the Philippine Islands, and it was estimated in 1906 that there were some 10,000 lepers in the islands or, roughly, 1 in every 1,000 was a leper.

The Indian census of 1921 gives an estimate of an average leper population of about 1 in 3,000, but those who have had the most opportunity of judging are of the opinion that 1 in 600 or even 1 in 300 would be a more correct figure.

With a population about 30 times as great and with a proportional endemicity perhaps 3 times as great, the problem in India is a very different one from that in the Philippines. Any attempt to follow the example of the smaller country in carrying out general segregation would obviously be impossible, and it may, therefore, be useful to mention briefly what methods it is proposed to adopt in India.

We have no reason to believe that leprosy is either rapidly increasing or diminishing in India, and if we assume what is probably the case, that it is at a standstill, it would mean that one leper in one generation infects, on an average, one healthy person in the next generation, and thus a balance is kept up. I believe that, if the programme that we propose is carried out efficiently, this balance will be upset and the disease will entirely disappear within a few generations.

Two most potent factors which make for the continuance of leprosy are the ignorance of medical practitioners and still more of the general public of the early signs of the disease, and the general prejudice which there is against leprosy as compared with other more transmissible and more fatal diseases. Medical students are given no practical training or clinical demonstrations which would enable them to make an early diagnosis, and many doctors have such a horror of the disease that they would not willingly undertake its treatment. Although leprosy is a far less communicable disease than tuberculosis, the superstitious dread of the former is so great that those known to be suffering from it are ostracised and, even before the disease has reached a stage

at which it is possible to find the bacilli on bacteriological examination, they are removed from their employment and thus placed in the very circumstances which are most favourable for the rapid increase of the disease. For we find in India that, in the great majority of cases, the disease may be diagnosed clinically from signs of nerve origin at a stage when carefully made bacteriological examinations are negative, and the patient has, presumably, not yet become a possible source of danger. It is found, moreover, that the great majority of such early cases, when they are efficiently treated at out-patient clinics for a sufficient time, lose all active signs of the disease, and, provided they are able to remain free from other diseases and otherwise maintain a normal amount of general resistance, remain free from such signs for an indefinite period. Though it would be unwise to speak of such patients as "cured," yet there is good reason to believe that the longer the time they remain sign-free, the less is the likelihood of recurrence.

It will thus be seen that, if a negative bacteriological result carried out by a medical man with sufficient experience relieves the early cases from the necessity of being isolated, and if the early signs of leprosy are widely known and recognised by medical men and by the public, and if doctors who are able to treat the disease efficiently are available for all, we should have the means of cutting off the transmission at its source, which is always the ideal method of dealing with a disease.

We are, therefore, putting the chief emphasis in our campaign in India in this direction, and our programme may be classified under 6 heads:—

(1) The appointment in each of the 9 provinces of an expert, who shall be a man of energy and personality, and who shall be responsible for the initiation and organisation of leprosy work in the province.

(2) The training of doctors and students by the experts.

(3) The establishment of out-patient skin clinics where suitable cases may be treated.

(4) The establishment of one or more leper colonies in each province.

(5) Propaganda work by preparation and distribution of suitable literature, through the co-operation of the educational authorities and teaching in schools, through various health authorities, and above all through the trained doctors, the out-patient clinics and the leper colonies.

(6) Research work, which, though it is placed last in the list, is to be considered the most important of all.

As regards treatment—leper patients may be divided into 4 groups:—

(1) Those who are bacteriologically negative and who can obtain expert medical assistance either from private practitioners or at out-patient clinics, within reach of their homes.

(2) Those who are bacteriologically positive,

but are able to isolate themselves in their homes and obtain local expert medical assistance.

(3) Those, bacteriologically positive or negative, who cannot get efficient treatment locally and those, bacteriologically positive, who cannot effectively isolate themselves in their own homes.

(4) Those who are unable to support themselves or whose relatives have refused to support them because of deformities, dread of the disease or other reasons.

Classes 1 and 2 should preferably be treated in out-patient clinics, and classes 3 and 4 in colonies or other segregation institutions.

Colonies will be situated within the province which they supply; each colony will be limited to 1,000 inmates and have a superintendent and a well trained, high grade medical man with at least 2 qualified medical assistants. Colonies will be on sites of at least 100 acres with good land for agriculture and the raising of cattle, etc., and a sufficient water supply. Inmates will be encouraged to take part in agricultural, horticultural or industrial pursuits, and provision will be made for education and practical training. Abundant, suitable work and exercise will be provided, and fresh vegetables and dairy produce,—very necessary articles in the diet of those suffering from leprosy,—will be secured by the labours of the patients themselves.

Compulsion will not be used in sending patients to these institutions, except in the case of pauper lepers and of those who persist in endangering the public by carrying on certain trades; but, when necessary, compulsion will be used in carrying out discipline within the colonies and in the early removal of new-born and symptom-free children from bacteriologically positive parents.

Cases which are bacteriologically negative or nearly so, will, as far as possible, be separated from those with the grosser skin types of the disease.

Having thus outlined our proposed programme for India, which has only as yet begun to materialise in some of the provinces, I shall place alongside of it the methods which are at present in use in the Philippines, along with other schemes which I have been informed are contemplated there, and compare, as far as I am able, the differing conditions in the two countries.

As far as I have been able to ascertain during my brief visit, the following are the main differences between the leprosy problem in the Philippines and that in India:—

1. The number of lepers to be dealt with both absolutely and relatively to the whole population.

2. The limitation of the disease in the Philippines almost entirely to poverty-stricken classes of the people and its comparative rarity among the socially higher classes; whereas in India all classes are affected, the very highest not being excluded.

3. The more rapid onset of the disease in the Philippines, and the consequent impossibility of

diagnosing it by clinical signs before it is possible to make a positive bacteriological examination. I was told that this is the case by those in charge of the work in Culion Island. It would imply an almost entire absence of patients of class 1. Now this last difference is one which I find myself unable to accept without further investigation. It is true that such cases are not commonly seen in Culion; but, when I visited the San Lazaro Hospital for lepers in Manila, I saw a possible explanation.

In this hospital there are more than 400 leper inmates, the great majority of whom have presented themselves voluntarily for treatment on the understanding that, if they become negative within a certain period, they will not be deported to Culion.

Now, according to the present law in the Philippines, a leper is only a leper when lepra bacilli can be found on bacteriological examination. Cases of leprosy, which in India we should diagnose on clinical grounds because of anæsthesia, nerve-thickening and other signs of nerve involvement, are not recognised as cases of leprosy in Manila; they are not admitted to San Lazaro Hospital or other leper institutions or treated by Government doctors until they are found to be bacteriologically positive.

I was told by one of the doctors in charge at San Lazaro that there are large numbers of such clinically positive but bacteriologically negative cases in Manila, and that in cases admitted to San Lazaro there was a history of clinical signs of the disease for an average period of about one year previous to their becoming bacteriologically positive. Now this would correspond more or less closely to what we have found in different parts of India—in Calcutta, in the Deccan and in South India among various races and in different climates—wherever leprosy patients have been attracted for treatment by efficiently run, voluntary out-patient clinics.

Before we started a clinic in Calcutta we had no idea that such cases existed in such numbers; and I am inclined to think that there might possibly be a similar finding in Manila and other places in the Philippines, if voluntary out-patient clinics were opened at various centres and run by first-rate doctors who had had extensive experience in the clinical diagnosis of leprosy from early clinical signs, as well as in the best methods of treatment. However, I think that no dogmatic statement should be made one way or the other before such an experiment has been made.

If such cases exist, it would only be natural that many of them should hide their malady out of fear of forcible detention, or should fail to recognise the significance of early signs, especially as they are not officially recognised in making the diagnosis.

It is obvious that the point is one that it is important to clear up as such cases do not need

to be segregated and are by far the most amenable to treatment; while by treating them the disease may be cut off at its source.

I think that a step in the right direction has been taken by establishing institutions like San Lazaro which are not so far removed from the homes of the people, but our experience in India, so far as it goes, lays great stress on the importance of abundant vigorous exercise in the treatment of leprosy and of mental and physical occupation, and I am not sure to what extent this can be carried out in institutions which are founded on the principle of the hospital ward, as at San Lazaro.

I believe that the principle of supplying exercise and occupation is being developed in connection with the Culion Colony, where many of the lepers are living on small farms and are engaged in fishing, market-gardening and other active employments. I am also glad to hear that there is a prospect of a road being opened up from the colony to another part of the island, which will further facilitate settlement on the land.

Another proposed development, which I consider of great importance, is the formation of facilities for the early removal of the children from their leprous parents to Manila, as many such children have in the past fallen a prey to the disease through contact with their leper parents or other lepers. Our experience in India points to the great importance of such measures in preventing the disease, and of making arrangements for the proper care of such children from earliest infancy.

I was greatly impressed with the efficient way in which pathological research is being carried out by Dr. Wade and his staff. I am deeply indebted to him for all that he taught me in this direction, I feel strongly that anything which is done to help and develop the work that he is doing will be of the greatest importance not only in the Philippines but wherever leprosy exists, and his work has its importance not only in connection with leprosy but in its bearing upon other diseases which are associated with leprosy.

It may not be out of place to mention here a scheme which Dr. Wade is initiating, a proposal for the early circulation of papers written by those engaged in leprosy investigation, so that such workers throughout the world may be informed of each other's results without the delay of waiting for publication in medical journals. It is hoped that in this way much waste of time and money will be avoided by preventing the unnecessary reduplication of work.

My visit has impressed upon me the importance of such personal conferences of research workers and the great possibilities of their results. I hope that it will be possible for us to welcome in Calcutta some of the workers from the Philippines.

My thanks are due to Dr. Avellana, the head of the Colony, and to Dr. Rodrigues, the chief physician; also to Dr. Perkins for all that he

showed me of the very important work that he is doing from the chemical side; also to the other members of the medical and pathological staff.

Above all, I wish to thank General Wood, Governor of the Philippine Islands, for his kind welcome and for all the facilities that he made for my visit to the Island of Culin.

CARREL'S TREATMENT AND ELECTROLYTIC CHLORINE AS AN ANTISEPTIC.

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THE introduction of "Electrolytic Chlorine," "E.C.," should give a great impulse to the treatment of septic wounds. There has been no greater advance in surgery as the result of war-time experience than what is known as "Carrel's method of irrigation of septic wounds with hypochlorite solution."

This treatment is absolutely based upon the principles enunciated by Lister. Dakin and Daufresne(1) proved by a very careful series of experiments that hypochlorite of soda in the presence of blood serum has approximately thirty times the sterilizing power of carbolic acid with reference to staphylococci, streptococci, the *Bacillus pyocyaneus*, and Welch's bacillus. It is true that perchloride of mercury is still more powerful, but this drug loses its strength so rapidly in contact with proteins and is so irritating that hypochlorite holds the field.

As the result of these researches, but also after careful observation of the direct action of various antiseptics on wounds, Dakin's solution finally emerged as in many respects the most satisfactory antiseptic. The special value of this fluid was that the alkaline, caustic element, present in ordinary hypochlorite solutions, had been eliminated, and in this way its irritant properties had been reduced to the minimum. This was most important, because the constant contact of a half per cent. hypochlorite solution with a wound surface is essential, if sterilization is to be effected. The hypochlorite combines, of course, with the proteins of wound tissues and secretions, and it is this which necessitates the continuous irrigation which is the characteristic of Carrel's method. Not only does such irrigation progressively destroy microbes, but also, as shewn by Lumiere,(2) it renders their toxins inert. In one striking experiment he inoculated pus from a case of severe tetanus into guinea-pigs. The pus was mixed with equal parts of 0.8 per cent. solution of common salt, and when injected into guinea-pigs caused death in 8 to 10 days. That, however, which was mixed in equal proportions with 1 per cent. hypochlorite solution and after an interval of one hour injected into other guinea-pigs proved quite harmless. In both experiments 1 c.c. of pus was used. This is only the illustration of many similar experiments dealing with a variety of microbes.

Staphylococci in aqueous suspension are killed by a hypochlorite solution of one in half a million.

It will be remembered that Carrel controlled his clinical use of this fluid with the microscope. He proved that in septic wounds, continuously and effectively irrigated with 0.5 per cent. Dakin's fluid, the number of microbes per field progressively diminished until, when there were only half a dozen per field or less, such wounds were practically sterile, and in many cases suitable for suture, which was followed by union by second intention.

Dakin's hypochlorite solution, although harmless subcutaneously, is most dangerous if injected into the general circulation, as it is hæmolytic.

The method of application to wounds is now familiar to many surgeons. The essential is that it must be distributed to the *whole* surface and the distribution maintained. This is, of course, very difficult where the wound area is irregular and contains diverticula, sinuses or lines of extension along planes of fascia. This is the crucial difficulty of Carrel's method of treatment. The branched glass distributing tubes and perforated rubber instillation tubes through which the solution is run over the whole of the wound, are now well known. If the technique is carefully carried out (and this is a very large "if"), splendid results can be obtained, and not only lives saved, which would have succumbed to septic toxæmia, but wounds which were profoundly septic can be rendered practically aseptic.

Before the introduction of "E.C.," Dakin's solution had to be prepared from bleaching powder of uncertain and varying chlorine content. Constant tests were required to ascertain the percentage of hypochlorite in order to maintain the 0.5 per cent. strength of the solutions used.

The introduction of "E.C." has changed all this. Pure "E.C." is, however, irritating in its action. It provokes serous discharge and discolours tissues, but without causing serious loss of vitality. A 20 per cent. solution should be used for irrigation of septic wounds by Carrel's method. A 10 per cent. solution of "E.C." is suitable for cleansing hands and preparing operation area: 5 per cent. is good for ward lotions and surgical dressings, but 1 per cent. is really adequate. For irrigation of the bladder or confinement cases 1 in 1,000 to 1 in 5,000 may be used.

For latrines 1 in 5,000 is most useful. The germicidal strength for *B. coli communis* is 1 in 75,000. For sterilization of water 3.06 m. per gallon or 19.2 m. per cubic foot may be used.

These and similar uses of E.C. are discussed in an important article by Col. Mackworth in the *Indian Medical Gazette* for October, 1922, and in the same journal in December, 1924, Major Napier gave an interesting series of cases illustrating the value of "E.C." in hospital work.

An important article by Hodgkinson and Hutchinson describes in full detail how unlimited

supplies of hypochlorite solution of 2.5 per cent. of available chlorine strength can be prepared from 25 per cent. bribe, 1 per cent. lime hydrate and 0.1 per cent. saturated solution of sodium rosinate by electrolysis, using a high current density of at least 1 ampere to the sq. cm. of the graphite electrodes and keeping the solution cool so as to avoid decomposition of hypochlorite. In this way the authors showed that a stable solution of much greater available chlorine content could be obtained than that obtainable under the conditions usually found in ordinary electrolytic cells, which have been designed to turn out large amounts of low strength solutions, mostly for commercial use.

The new "E.C." standardized at 2.5 per cent. available chlorine has this great value, that it can be used in surgical and other work with confidence. In order to obtain preparations of similar reliability, the principles laid down by Hodgkinson and Hutchinson(3) must be observed. Any failure to do so, may involve not only loss of chlorine percentage but also of hypochlorite. With due attention to current density and adequate cooling arrangements, improvised apparatus may be possible. Stevens, (4) for instance, of Miraj, describes such an arrangement by which 2 per cent. "Electrolytic Chlorine" may be obtained. There is risk in ordering installations other than those designed by Hutchinson, of finding that the output of "E.C." is not only below the specification, but that it is even considerably less than 1 per cent.

A cell with ten chambers and graphite electrodes which I imported from a well known firm in London, although stated to produce 2.5 per cent. "E.C.," only gave 1 per cent. after careful adjustment. Any solution above 0.5 per cent., if of constant strength, is useful, and the degree of dilution can be adjusted. It is, however, of first importance always to know what the amount of concentration really is.

As electrolytic cells are liable to vagaries, and the output may vary from time to time in its strength, it is necessary to test the "E.C." systematically to ensure its being up to standard. The same applies to the supplies of "E.C." which are now on the market. This is also of special importance in view of the deterioration which results from exposure to heat. At a temperature of 30°C, however, it keeps its strength for 6 weeks, and below 22°C for a year.

The following tests may be employed:—

Titration to Estimate Available Chlorine and Hypochlorite per cent.—Measure 10 c.c. of the solution, add 20 c.c. of 10 per cent. solution of iodide of potassium, 2 c.c. of acetic acid, then drop by drop a decinormal solution (2.48 per cent.) of hyposulphite of soda up to decoloration. The number (N) of c.c. used, multiplied by 0.03725 gives the percentage of hypochlorite, and N multiplied by 0.0355 = active chlorine per cent. Another test given by Hutchinson is the following:—

Standard Sodium Thiosulphate Solution.—Dissolve 14.1 grams of pure sodium thiosulphate in re-distilled water and make up to one litre. Standardise by titrating against pure iodine (say, about 0.2 grams dissolved in potassium iodide solution).

The number of grams of iodine multiplied by 140 should equal the number of c.c. of $\text{Na}_2\text{S}_2\text{O}_3$ required to render the solution colourless.

Procedure.—Pipette 2 c.c. of E.C. into an Erlenmeyer flask; add 5 c.c. of a 10 per cent. solution of potassium iodide and add 5 to 8 drops of glacial acetic acid. Now add $\text{Na}_2\text{S}_2\text{O}_3$ solution until the liquid is quite colourless. The number of c.c. of $\text{Na}_2\text{S}_2\text{O}_3$ used up, divided by 10 gives the percentage of available chlorine in the sample.

The former method is simpler, the latter is useful as a control.

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TREATMENT OF VARICOSE VEINS OF THE LEG BY AN OCCLUSION METHOD.

By D. R. KEHAR,

CAPTAIN, I.M.S. (T.C.),

As a surgical specialist in Waziristan and Palestine, I had the opportunity of performing the radical operation for the treatment of varicose veins of the legs on about fifty cases, both British and Indian soldiers, but almost always found that convalescence was very prolonged.

This result, in my opinion, was mostly due to the defective blood supply of the skin immediately over and near the varicose vein and, therefore, diminished resistance to any pyogenic organisms which may be left at the time of operation. Moreover, in some cases the scars formed after the radical operation broke down and led to troublesome ulceration.

Last year, I tried the occlusion method on ten cases and found that the results were very encouraging and the patients were very comfortable during the period of treatment.

Technique.—The leg to be operated upon is shaved the night before operation and painted with tincture of iodine. Next morning when the patient is brought to the table, the leg is cleaned with spirit and painted with tincture of iodine again. A tourniquet is applied above the knee loosely to make the veins prominent.

Anæsthesia may be local or general.

The only instruments required are:—Wakley's fenestrated artery forceps, one pair; and some stout half curved needles threaded with strong No. 5 silk thread ligatures.

As soon as the patient is under the effect of the anæsthetic, Wakley's artery forceps are applied round the vein along with the skin and clipped. The vein, along with the skin, is then lifted up from the underlying structures by a pull on the forceps. Then a needle threaded with strong No. 5 silk thread ligature is passed underneath the vein and the ends of the thread are tied over it. In this way sutures are applied to the vein from above downwards, the sutures being half an inch to three quarters of an inch apart. The patient is then returned to bed.

Result.—The veins begin to shrivel up in about seven to ten days and get completely shrivelled up in about three weeks. The patient need not be confined to bed all this time. I usually keep him in bed for about forty-eight hours.

About ten days after the operation alternate sutures, beginning at the second suture from the top, are removed and the rest in about three weeks.

This method is very useful in the treatment of varicose ulcers as the shrivelling up of the veins relieves the skin over them of their constant pressure and allows the establishment of free circulation of blood. The ulcers under these circumstances quickly heal up under ordinary aseptic and antiseptic treatment.

DIABETES AND INSULIN TREATMENT IN BENGAL.

By Dr. LAL MOHAN GHOSAL, I.M.S.,

Demonstrator of Physiology, Medical College, Calcutta.

INSULIN treatment in diabetes has now become common practice, but in Bengal, so far as my experience goes from both hospital and private cases, not much benefit has accrued from it. This is not only my experience, but it is the experience of many other general practitioners in Calcutta. In Europe, on the other hand, insulin is being extolled to the highest degree as a treatment for diabetes. In America, too, where the drug was discovered, it is recognised as a remedy for diabetes, if properly used, although savants such as Maclean and others, while recognising that it is not a cure for diabetes, yet accept it as a beneficial agent in the treatment of diabetes. The question naturally arises why it is that in Bengal where diabetes is so prevalent such beneficial results are not obtained; in many instances no benefit at all has been derived either in reducing blood sugar or urinary sugar even with strict dietetic and other regulations.

The idea of insulin treatment was first suggested in Minkowski's experiment which showed that deficiency in the internal secretion of the pancreas was responsible for diabetes from the degeneration of the islands of Langerhans. Following out this theory, insulin was discovered in extracts of the islands of Langerhans. This extract was found to be glycolytic and the discoverers claimed admirable cures of diabetes.

But alas, in India the results are far from what was expected. Very few cases are known to have derived benefit from it—far from being cured.

Is it that the diabetes that is generally found in India and particularly in Bengal is not due to any pancreatic defect? It occurred to me to investigate if it is possible to find any means by which the pancreatic defect could be detected. There is, so far as is known, no direct means to determine it, but the Cammidge reaction in the stools suggested itself to ascertain whether pancreatic defect was present in Bengali diabetics.

The following is the result of this investigation.

I divided the cases into the three following categories:—

Group I. Very marked pancreatic defect without diabetes.

Group II. Diabetes without any pancreatic defect.

Group III. Diabetes with pancreatic deficiency.

Group I. Marked pancreatic defect without diabetes.

Case No. 1.—A patient with pain in the right hypochondriac region and a tumour-like mass. I examined the stool and urine for the Cammidge reaction and found the following results:—

| | |
|-----------------------|-----------------|
| Pancreatic deficiency | .. 76 per cent. |
| Intestinal deficiency | .. 66 per cent. |

The urine was positive to the Cammidge test, but no glucose was found. I hazarded the opinion that the case was one of tumour at the head of the pancreas; of course I had not seen the case and did not know the previous history at first; the case was admitted into hospital; was operated upon and a big cyst was discovered at the head of the pancreas; the cyst was removed and the case was completely cured. I learnt this subsequently when he came with the stool for examination and gave a detailed story of his case. His stool showed this time the following result:—

| | |
|------------------------|-----------------|
| Pancreatic sufficiency | .. 80 per cent. |
| Intestinal sufficiency | .. 72 per cent. |

In this case it may be noted that with such pancreatic insufficiency and with a tumour in the pancreas he never showed glucose in urine.

Case No. 2.—An Anglo-Indian in Government employment, had suffered from diarrhoea for a year with very loose stools with occasional mucus. He was very thin and emaciated; and had had injections of emetine and a course of streptococcal vaccine; he had been diagnosed as a case of sprue; but no benefit resulted from any of the treatments. He came to me and I examined his stool and found the following result:—

| | |
|-----------------------|-----------------|
| Pancreatic deficiency | .. 78 per cent. |
| Intestinal deficiency | .. 70 per cent. |

His urine never showed sugar in spite of such marked pancreatic deficiency. He was put on to a regulated milk diet for three months and was completely cured.

Case No. 3.—A European, manager of a big bank, had alternate attacks of diarrhoea and constipation which made him very thin; there was complete anorexia; whatever he took as food he vomited two hours later; of course he was living on European diet. His stool

and gastric contents were examined. His gastric contents showed deficiency in acidity and ferment activity, whilst the stool showed the following results:—

| | |
|-----------------------|-----------------|
| Pancreatic deficiency | .. 67 per cent. |
| Intestinal deficiency | .. 60 per cent. |

There was no sugar in his urine. He was put on to a simple milk and fruit diet and recovered in the course of three months; then he went away to England. He is still alive, as his name is mentioned in a big bank case.

Case No. 4.—A. C. C., a clerk, had alternate attacks of diarrhoea and constipation for one year, then constant diarrhoea with frequent stools and griping for three months; sometimes he passed bloody and mucoid stools. Injections of emetine were given; a course of treatment with streptococcus vaccine from a strain isolated from the stools was given; but with no effect. Tuberculosis was then suspected and a course of tuberculin was also given but without benefit. His stools showed the following results:—

| | |
|-----------------------|-----------------|
| Pancreatic deficiency | .. 90 per cent. |
| Intestinal deficiency | .. 80 per cent. |

With such virulent pancreatic deficiency he never showed sugar in the urine; the Cammidge reaction in the urine was also negative. He finally died.

Case No. 5.—A. C. M., manager of a big estate—suddenly developed diarrhoea with dyspepsia; he was treated with various remedies but without improvement. His stools showed the following results:—

| | |
|-----------------------|-----------------|
| Pancreatic deficiency | .. 70 per cent. |
| Intestinal deficiency | .. 70 per cent. |

He changed his treatment and was finally relieved by Kabiraji treatment and a change.

I might cite numerous other such cases, but as the list becomes a heavy one I select these typical cases. In such cases we find that although there is severe pancreatic deficiency, due either to organic defect of the pancreas or to functional defect of the organ, there is no diabetes or glycosuria in any of these cases at any period.

Group II. Diabetes without any pancreatic defect.

I will next cite patients who had had diabetes for years and years together without any pancreatic deficiency, and they were long-lived and held important positions in life.

Case No. 1.—P. B., head clerk in a very important office, contracted diabetes at the age of 45 and died at the age of 82; all the while he was working in his capacity as head clerk, except for the last two or three years of his life when he was forced to take rest by his sons who have all attained to great eminence. I examined his stools thrice at different intervals and at no time was there any pancreatic deficiency found; the following was the result of examination of his stool:—

| | |
|-----------------------|-----------------|
| Pancreatic deficiency | .. 26 per cent. |
| Intestinal deficiency | .. 32 per cent. |

Case No. 2.—Rai Sahib C., a big zemindar, living a luxurious but careful life; in his younger days he had been manager of a big colliery estate which was much encumbered; by his administration the estate became a solvent one and the income rose from Rs. 12,000 to Rs. 60,000 a month. He contracted diabetes at the age of 42 and is still living, his age being now 65. He left the service of the estate at 44 and is now managing his own estate which is worth not less than 50 lakhs. His urine and stools I examined frequently and there was never any pancreatic deficiency detected. This is a very good case suggesting that mental strain plays an

important part in the etiology of diabetes. Examination of his stools gave the following result:—

| | |
|-----------------------|-----------------|
| Pancreatic deficiency | .. 20 per cent. |
| Intestinal deficiency | .. 30 per cent. |

Case No. 3.—J. C., a retired *munsif*, contracted diabetes at the age of 37 and is to-day still passing sugar, 4 per cent.; his age is now 75. He is to-day quite hale and hearty, not thin and emaciated, sits as an honorary magistrate, and during my connection with him for 20 years I have never seen him in bed for more than 24 hours, and even then only owing to some minor ailments such as occasional influenza or dengue. He showed no pancreatic deficiency in his stools. The result of stool examination showed the following:—

| | |
|-----------------------|-----------------|
| Pancreatic deficiency | .. 36 per cent. |
| Intestinal deficiency | .. 28 per cent. |

Case No. 4.—Mrs. D., of a very rich zemindar family in Calcutta, contracted diabetes at the age of 46 and was passing sugar, 5 per cent.; to-day her age is 52 and she is still passing sugar, 5 per cent.; she is very fat and a widow, following strictly the obligations of a Hindu widow. Her stool on examination showed the following result:—

| | |
|-----------------------|-----------------|
| Pancreatic deficiency | .. 30 per cent. |
| Intestinal deficiency | .. 38 per cent. |

She was given insulin with strict regulation of the diet as far as possible under the conditions, present, but her urinary sugar never came below 3 per cent. She was then treated with codeine and uranium nitrate and her sugar came down to 0.8 per cent., but albumin appeared in the urine, when all treatment was discontinued, and only lately her urine was examined and 5 per cent. of sugar was found. Her stool recorded exactly the same figure as on the previous occasion.

This is a very instructive case; it shows practically normal pancreatic sufficiency and in spite of a course of insulin there was no appreciable benefit; I will deal with this point later on.

Case No. 5.—D. S., medical practitioner, contracted diabetes at the age of 37 and is still passing sugar, his age being now 48; he has shown 3 to 5 per cent. of sugar all through. He is fat, well built and maintains his health just as well as he was before passing sugar.

| | |
|-----------------------|-----------------|
| Pancreatic deficiency | .. 36 per cent. |
| Intestinal deficiency | .. 48 per cent. |

He was a voracious eater and he can still eat a hearty meal and can also digest as well; yet the sugar in the urine never rose above the level of 5 per cent.

Case No. 6.—Rai Bahadur M., a high government official, with extensive touring duties contracted diabetes at the age of 34; his age is now 53; the first time his urine was examined, it showed nearly 7 per cent. of sugar, he was at one time very bad with carbuncle but his sugar never came down below 2 per cent. He was very susceptible to boils and carbuncles and therefore he was advised insulin treatment. He consulted me and I advised him to have his stool examined. His stool examination gave the following results:—

| | |
|-----------------------|-----------------|
| Pancreatic deficiency | .. 27 per cent. |
| Intestinal deficiency | .. 40 per cent. |

Under these circumstances, I doubted very much whether insulin would do him any good. But he still took insulin with the usual precautions—nearly 1,000 units—yet his sugar in the urine never came down below 2 per cent. Last time I examined his urine, it showed 3.3 per cent. of sugar.

This case is an example of out-door life with an almost European diet for nearly 30 years. He is a very healthy and stoutly built person, digests his food well and still maintains very good general health. Yet in his case insulin treatment was not at all successful. He finally left off the treatment, being tired of so many injections.

Case No. 7.—A lady of high rank, a diabetic for three years, aged 45, passing sugar, 5 per cent., had a course of insulin treatment of 500 units; yet continued to pass sugar in the urine, 4.2 per cent. She was tired of the injections, but being an educated woman wanted to know why the insulin treatment was not doing her any good. She consulted me about it and I advised an examination of the stool to determine whether she was really a pancreatic case. I examined her stool and found the following result:—

| | |
|-----------------------|-----------------|
| Pancreatic deficiency | .. 32 per cent. |
| Intestinal deficiency | .. 40 per cent. |

I definitely told her that insulin would not prove of much avail; it happened that she continued with insulin up to 1,000 units and when her urine came to me for examination it still showed 5 per cent. of sugar to her disappointment. She has since discontinued insulin treatment.

I might cite numerous other cases, but these are quite sufficient for this group.

Now I come to the third group of cases:—

Group III. Diabetes with pancreatic deficiency.

Case No. 1.—P. H., aged 16, complained of thirst, polyuria and hunger, and was very emaciated and anæmic; duration of illness nearly a year; I examined his urine and blood and stool; his urine showed 8 per cent. of sugar; his blood sugar was 0.43 per cent.; his stool showed the following result:—

| | |
|-----------------------|-----------------|
| Pancreatic deficiency | .. 76 per cent. |
| Intestinal deficiency | .. 66 per cent. |

This is a typical case of pancreatic diabetes; he was given 500 units of insulin with a slightly modified diet, mainly substituting *channa* (milk curd) for half the amount of carbohydrate. He was completely freed from sugar in his urine, his blood sugar came down to 0.12 per cent. and he gained about 8 lbs. in weight in the course of three months. When I last saw him about a month ago he was still free from sugar on his ordinary diet.

Case No. 2.—K. C. D., aged about 30, had contracted diabetes only three months before and had lost about 25 lbs. of weight; when he was last seen by me his urine showed 5 per cent. of sugar; he was very dyspeptic, thin and emaciated and anæmic. His stool showed the following result:—

| | |
|-----------------------|-----------------|
| Pancreatic deficiency | .. 58 per cent. |
| Intestinal deficiency | .. 56 per cent. |

He was put on insulin treatment and, in the course of a month, the sugar in the urine has come down to 0.2 per cent.; he has gained 4 lbs. in weight and his anæmic appearance is much better.

Case No. 3.—Mrs. B., aged 34, formerly very stout when I used to see her before as her family physician, was much reduced and had an anæmic appearance; her urine showed 4 per cent. of sugar; her stool showed the following result:—

| | |
|-----------------------|-----------------|
| Pancreatic deficiency | .. 52 per cent. |
| Intestinal deficiency | .. 66 per cent. |

She was put on insulin treatment and she has also improved considerably. Her urine now shows only 0.4 per cent. of sugar and her anæmic appearance has also improved, and I am of opinion that she has also gained in health and weight, though there was no opportunity to take her weight before and after the treatment as she is a purdah lady.

Case No. 4.—J. C., gave a history of diabetes of six months' duration; very thin and emaciated and almost bed-ridden. His urine showed 5 per cent. of sugar; very dyspeptic and had never a good robust constitution. His stool showed the following result:—

| | |
|-----------------------|-----------------|
| Pancreatic deficiency | .. 80 per cent. |
| Intestinal deficiency | .. 70 per cent. |

His is a very difficult case, as although he was put on to insulin treatment with strict diet regulation, yet he is not improving very much. After 100 units of insulin his urine still shows 3 per cent. of sugar.

From the above I draw the following conclusions:—

1. With very marked pancreatic defect, even with a big tumour at the head of the pancreas, sugar was never detected in the urine in some cases.

2. Even with marked diabetes, pancreatic defect could not be found in some cases. Such patients are long lived, keeping good health throughout. None of them responded satisfactorily to insulin.

3. With pancreatic defect and glycosuria, the patients were always in bad health and there was evidence of rapid emaciation from the beginning; these are the cases that respond to insulin treatment.

With the first series of cases it may be concluded that at least some portion of the islets of Langerhans was spared and, therefore, the internal secretion was maintained at a sufficient level to prevent diabetes or glycosuria, whereas in the third series of cases the islets of Langerhans were either inactive or became suddenly functionless, and hence the result is diabetes. Naturally, therefore, the conclusion is that the selection of cases for insulin treatment should be made by determining the activity of the pancreatic function, and the success of the treatment will depend upon this. The many failures of insulin treatment that we see in India—particularly in Bengal—are not the fault of the insulin but of faulty selection of cases. For diabetes is not the result of defect in the pancreas only; it may be so in one group of cases; but there are other factors to be taken into consideration, such as (1) Diabetes resulting from dyspepsia with a high threshold level of the kidney, causing a constant sugar reserve in the blood. (2) Diabetes resulting from the defect in the endocrine system such as defect in the adrenals, thyroid, pituitary and so on. (3) Diabetes arising from shock to the central nervous system such as by heat-stroke or disease or hæmorrhage in the floor of the fourth ventricle. (4) Diabetes from defect in the sympathetic system. (5) Diabetes from excessive metabolism of carbohydrates such as Von Noorden's "excessive mobilisation" or McCay's "onward march." (6) Finally diabetes resulting from liver deficiency—Pavy's "low formation of glycogen from blood sugar," or Claude Bernard's "excessive re-formation of sugar from breaking down of glycogen." I do not want to go into a detailed discussion of those various theories, but what I want to point out is that these cases will never be benefited by insulin treatment; what may happen is that insulin—having glycolytic properties on the sugar—may cause a small amount of glycolysis of sugar in the blood, but that only to a very small extent,

and that also, if at all, only after a very prolonged course of treatment. It is not my intention to discourage insulin treatment, far from it, but rather on the contrary to encourage it by selection of proper cases, so that unnecessary blame is not attributed to one of the most scientific treatments ever discovered.

The question arises as to how to select cases of diabetes due to pancreatic deficiency. The following points may serve as a guide:—

Clinically, the disease is of short duration and within a very short time—say, three months—the patient becomes very emaciated: the anæmia is very marked; the body fat is markedly reduced, leaving a skeleton-like appearance; dyspepsia is very troublesome; sleep at night is disturbed, sometimes there is no sleep during the whole night; weakness is very marked; irritability of the temper is very prominent and there is general lethargy and lassitude.

Pathologically, the pancreatic deficiency as shewn by Cammidge's test is very marked.

Treatment with insulin in these cases is very successful, and by suitable doses complete arrest of the malady may be expected. But the treatment has to be continued on and off periodically for if it is stopped for any length of time, diabetes again appears and with a virulence which sometimes becomes fatal. It is similar to the case of cretinism, where the thyroid treatment has to be continued throughout life or until the thyroid becomes active. So it is with this type of diabetes; there has been complete or partial atrophy of the islands of Langerhans and until there is new growth or recovery of the islands the treatment is to be continued at regular intervals. If the islands are totally atrophied, the treatment has to be kept up throughout the whole period of life.

A Note on the method of determining Pancreatic Deficiency.

The stools of the patient are collected for 24 hours. They are well mixed and then the test may be done by either the dry or the wet method. I myself prefer the wet method. About 5 or 6 grammes of stool are weighed out and extracted with ether by constant shaking for about 10 minutes. The whole of the ether is filtered through a fat-free filter paper. If fat-free filter paper is not available, dip some filter papers into ether, and before the time of use wash them again with ether and they will be fat-free. The ether is collected in a weighed porcelain basin and dried on a water-bath. This again is dried in a dry oven for 2 hours. The result will be fatty acid and neutral fat or non-saponified fat. Another sample of stool, say about 5 or 6 grms., is weighed and boiled with 10 per cent. hydrochloric acid for 4 hours in a flask with a condenser tube. The faeces thus treated are then filtered and then extracted with ether in a Soxhlet's apparatus. The ether is then filtered and evaporated on a water-bath in a weighed capsule or flask. This is again dried in a dry oven for 2 hours. This gives the total fat; from this the previous estimate of the non-saponified fat is subtracted and the result is the amount of saponified fat. The non-saponified fat obtained is again boiled with 5 c.c. of N/10 caustic soda to which a drop of phenolphthalein is added. The boiling is to be done for at least an hour, all the while keeping the quantity of water nearly the same by addition of more water during the process of boiling.

In this way the fatty acid combines with the caustic soda and the excess is treated with N/10 HCl. This gives the fatty acids. From the non-saponified fat the amount of fatty acid is subtracted, and this gives the neutral fat. The following is the relationship showing the intestinal and pancreatic activity:—

The ratio of saponified fat to non-saponified fat gives an index of the intestinal activity. This ratio of saponified fat plus fatty acid to neutral fat gives an index of pancreatic activity.

A Mirror of Hospital Practice.

A CASE OF ABDOMINAL INJURY.

By Y. S. ROW, L.M.P., Bellary.

WHILST I was in an outlying dispensary in this district, a boy of 7 years was brought to me at 11 p.m. on the 14th January, 1923 from a distance of 12 miles with a history of having been injured in the abdomen by the horn of a bull about 4 p.m. that afternoon. The intestines were protruding through a wound in the abdominal wall, and had been wrapped in a dirty cloth tied round his abdomen. His pulse was very feeble and almost imperceptible, with a sub-normal temperature and a cold and clammy sweat all over the body; whilst extreme thirst was present, and all the symptoms of profound shock.

On removing the dirty cloth, about 7 feet of small intestine was found protruding through a small punctured wound $1\frac{1}{2}$ inches to the right of the umbilicus. The patient was now anæsthetised and the protruding gut well washed with warm saline and an attempt made at its reduction. This proved to be impossible, as the wound in the abdominal wall was valvular in character. The wound was therefore enlarged and the gut further examined in order to make sure that it was uninjured. The patient passed urine on the table, soiling the protruding gut, which was then again well cleansed. The gut was returned to the abdomen, and the wound closed, a pint of saline being given hypodermically to combat shock.

The patient's condition was critical for the next 48 hours, but with the exception of a stitch abscess, he made an excellent recovery subsequently. When seen $5\frac{1}{2}$ months later he was in excellent health, and no ventral hernia had developed. The interesting features of the case are the absence of injury to the gut, and the patient's recovery after the protruding gut had been wrapped for some seven hours in a filthy cloth.

TWO CASES TREATED WITH INTRAVENOUS IODINE.

By RAM PERSHAD, L.M.P.,

Chuckmeshi Dispensary, Ranitola P. O., Durbhanga.

I HAVE recently had two cases where it appeared to me that intravenous injections of

tincture of iodine saved either the lives, or the limbs of the patients concerned.

The first was a male adult patient admitted to hospital with acute cellulitis of the whole of the leg and threatening gangrene, as the result of a septic pin prick some days previously. I operated on the case, making free incisions, but despite all surgical measures and removal of all slough, and free drainage, the patient's condition became critical, and gangrene threatened. I put him on to intravenous injections on alternate days, each of 5 minims of tincture of iodine in half a drachm of water. From the time of the third injection, improvement was immediate and rapid, and he made a sound recovery.

The second was a case of acute carbuncle of the leg with severe inflammation of the leg from ankle to knee. After operation the patient did badly, and there was no improvement. I adopted the same procedure as in the first case, giving 5 minims of tincture of iodine in half a drachm of water intravenously every alternate day. Improvement was immediate and marked, and he has made a good recovery.

The method appears to be especially useful in all cases of acute septic infection.

A CASE OF MUSCULAR DYSTROPHY: PSEUDO-HYPERTROPHIC TYPE.

By J. B. HANCE, O.B.E., M.B., B.Ch. (Cantab.), F.R.C.S.E.,
MAJOR, I.M.S.,
Civil Surgeon, Dera Ismail Khan.

THIS case is recorded as illustrating the commonest form of that rare group of diseases, the myopathies, or muscular dystrophies.

and characterised by progressive muscular wasting and weakness during infancy and childhood." (1)

The patient, a young Wazir Pathan, aged about 8, was brought to hospital with the history of 4 years' difficulty in walking, with frequent falls when walking or standing. On enquiry, his maternal uncle was said to have died in early life from a disease with similar symptoms.

The patient's childhood had been apparently normal, until about the age of 4, when it was noticed that his arms were losing power and his gait becoming peculiar.

His previous history afforded no help, the patient having always been healthy.

On examination the most pronounced feature was the disproportionate size of the muscles of the calf, as compared to the wasted, insignificant thighs and upper limbs, well seen in Figs. 1, 2 and 3. Fig. 1 illustrates well the pseudo-hypertrophy of these muscles and the lordosis characteristic of this group of diseases, as well as the characteristic attitude assumed standing with the feet wide apart.

Fig. 2 shows the atrophy of the pectoralis major (compare that of the normal child in Fig. 7). The calf hypertrophy is also well seen.

Fig. 3 illustrates the "winging" of the scapulae consequent on the wasting of the serrati magni and rhomboids and the pseudo-hypertrophy of the infra-spinatus is also well shown.

Figs. 4 and 5 illustrate Gower's pathognomic sign. In rising from the ground patient first rolled over into the quadrupedal position (Fig. 4) and then "climbed up himself" (Fig. 5).



Fig. 1.



Fig. 2.



Fig. 3.

The common feature of these diseases is the "atrophy of the skeletal muscles from congenital defect and subsequent pathological change, unassociated with any lesion of the nervous system,

The weakness of the muscles of the shoulder girdle is well seen in Fig. 6, illustrating the "slipping through the hands" when patient is lifted with the hands of the lifter in his axillae.

Compare this with the similar lifting of a normal child of the same age. (Fig. 7.)

It is unfortunate that the photograph illustrating the clumsy waddling gait with the feet wide

It was noticed that the patient fell frequently when walking and even when standing for some time in the same position.

The morbid anatomy of this group of diseases,



Fig. 4.



Fig. 5.



Fig. 6.

apart was unsuccessful, but the latter feature of the gait is well seen in Fig. 3, while the relative weakness of the shoulder and upper arm muscles as compared to those of the forearm and hand is



Fig. 7.

well-illustrated in Figs. 2, 3 and 4, as are the relatively insignificant buttocks and thighs.

Examination.—With the exception of the above noted changes in the muscular system, no abnormality could be detected in the cardio-vascular, respiratory, digestive, urinary and nervous systems. The reflexes were unaltered, sensations unchanged, and sphincters unaffected. General health was good and appetite and spirits unimpaired.

constituting it will be remembered, an atrophy of the muscle fibres combined with increase of nuclei beneath the sarcolemma and deposit of fat between the muscle fibres, and the unknown ætiology constitute an interesting study.

Whether the recent modification of our previous ideas as to the innervation of the skeletal muscles will afford any clue to the causation and treatment of these diseases is an equally interesting speculation.

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A CASE OF VESICAL CALCULUS FORMED AROUND AN INSERTED FOREIGN BODY.

By Dr. J. W. McK. NICHOLL, M.D. (Cantab.),
C. M. S. Hospital, Quetta.

B. K. was admitted to this hospital on 30th April, 1924, suffering from the typical symptoms of vesical calculus; he gave the following interesting history. Six months previously he had had an attack of renal colic, which was relieved by some subcutaneous injections, but retention of urine followed; a medical practitioner then passed a rubber catheter and withdrew the urine; he then filled and washed out the bladder with a solution of potassium permanganate, but this fluid did not return. After twisting the catheter about he withdrew it, saying he could do no more. The patient passed the solution mixed with urine but in small quantities frequently and a burning sensation was felt in the penis. For two months the patient passed pus mixed

with blood, before, during, and after micturition; at the end of the act too, small pieces of "flesh" were passed. These symptoms he stated cleared up on his taking some medicine by mouth.

On admission he complained of a burning sensation during micturition and pain in the hypogastrium while walking.

The day after admission a lithotrite was passed and the stone crushed. Among the debris evacuated from the bladder were pieces of rubber catheter; these were embedded in the centre of the stone. The stone was of soft subsistancy, yellow in colour and oxalic in origin.

Undoubtedly, the doctor had used a rubber catheter which had perished, the tip had broken off in the bladder, around this the stone had formed. The patient made an uneventful recovery and was discharged on the fifth day.

The purport of this note is to utter a warning against the use of "perished" rubber catheters and also to show how quickly a stone forms around a foreign body in the bladder.

NOTES ON A LARGE SCROTAL HERNIA OPERATED UPON UNDER APOTHE-SINE.

By S. G. CHAVAN,
CAPTAIN, I.M.S. (T.C.)
and

J. P. ARLAND,
LIEUT., I.M.S. (T.C.)

Indian Station Hospital, Kirkee.

A MADRASI by name Michael, aged 65, by occupation a *chowkidar*, was admitted into the Cantonment Hospital, Kirkee, with a large scrotal hernia.

Previous History. The patient stated that he noticed a protrusion into the left half of his scrotum two years ago. He was subject to chronic bronchitis, which aggravated the condition of the swelling. The tumour was at first the size of a small lime and was easily reducible. During paroxysms of coughing the protrusion gradually increased in size, much to the patient's discomfort.

We first saw him on 29th September, 1924. The hernia was the size of an orange and reducible. The man was not willing to undergo an operation. He was discharged the next day.

On 6th December, 1924, the patient again sought admission. He came in with a very severe attack of bronchial asthma. The hernia had very appreciably increased. A little difficulty was experienced in effecting its reduction. He again expressed unwillingness to be operated upon. A truss was applied and the patient discharged.

On 2nd February, 1925, the patient was brought into hospital in a state of collapse with

a pulse of 115 and a subnormal temperature. He was suffering from an acute attack of bronchial asthma. Examination disclosed an enlarged heart, emphysematous lungs, and rigid tube-like arteries. The hernia had assumed the dimensions of a large cocoanut. It was irreducible. There was an impulse on coughing. The scrotum was distended and tense. Enlarged vessels were seen making a free anastomosis around the lower abdominal wall.

Operation was decided upon, to which the patient now readily consented. Local anaesthesia was used. Apothesine (Parke Davis) was chosen. A 0.5 per cent. solution was used.

Technique of Anaesthesia. A point 1 inch internal to and $\frac{1}{2}$ inch below the anterior superior spine was selected and an intradermal wheal made. The needle of the hypodermic syringe was plunged vertically down till the resistance of the external oblique was felt and four drachms of a 0.5 per cent. solution deposited. The needle was then thrust horizontally in a direction midway between the anterior superior spine and the spine of the pubis and one ounce injected. The needle was withdrawn and an intracutaneous infiltration made in the line of the proposed incision. After exposure of the sac its neck was infiltrated with about 2 drachms.

Operation. An incision $4\frac{1}{2}$ inches long was made parallel to Poupart's ligament, and extending to the upper third of the scrotal bag. A finger was passed into the scrotum, adhesions broken down and the gubernaculum testis severed. The external oblique aponeurosis was found firmly united to the sac. There were a number of adhesions between the sac and the internal oblique and transversalis muscles, which were broken down. The cremaster was completely atrophied. The abdominal rings were induly stretched and large, and admitted five fingers. At this stage taxis was tried and the contents of the sac reduced. The cord with the attached testis was ligatured near the internal abdominal ring and cut away. The sac was transfixed and the internal ring completely closed. The anterior sheath of the rectus was incised, thus mobilising the internal oblique, which was stitched along with its conjoined tendon and tucked under Poupart's ligament. The aponeurotic flaps of the external oblique were sutured by the Andrews Halstead method. The skin wound was incompletely closed and a gauze drain placed at the bottom of the scrotum.

On 7th March, 1925, the patient was discharged completely cured.

Observations.—

- (1) The anaesthesia was perfect and profound.
- (2) Absence of shock.

(3) Strength to the weak abdominal wall was given by completely obliterating the canal, for which reason the cord with the testis was removed.

(4) Incision into the rectus renders easy the mobilising of the rectus internal oblique.

(5) Large quantities of apothesine were purposely used, as much as 13 grains were spent and no toxic effects noticed.

A CASE OF ANKYLOSIS OF THE KNEE-JOINT CURED BY EXCISION.

By U. N. RAY CHAUDHURI, L.M.S. (Cal.),
Teacher of Surgery, Campbell Medical School and
Surgeon to the Hospital.

IN his interesting article in the *Indian Medical Gazette* of December last, Major W. L. Harnett, F.R.C.S., I.M.S., mentioned a case of ankylosis of the knee-joint following septic arthritis. He gave a photograph and also a radiographic picture of the knee, shewing what extreme deformities one has to deal with at times. Excisions of knee-joints are not of every day occurrence, and the results of excisions in such cases when performed—in my opinion—should be fully reported to enable the general practitioner to form an estimate of what may be expected from conservative methods. Unnecessary amputations in such cases may thus be avoided. This patient is a native of Dhubri, Assam. He is a cultivator by profession and is 24 years of age. He was kicked by a bullock on his right knee while working in the fields six months previous to his admission to hospital. He developed severe septic arthritis. The joint became very much swollen and painful, and being far away from competent medical aid he himself punctured the joint and let out the pus. Violent sepsis followed, resulting in long-continued suppuration with destruction of the end of the femur and backward dislocation of the tibia and fibula. The condyles had separated as sequestra from the end of the bone, which latter stuck out of the wound for months. He was treated in a civil hospital in Assam and the end of the bone in time became covered by dense, rough scar tissue. The patella was displaced to the outer side and lay fixed and buried in dense adhesions. Firm ankylosis followed with the joint flexed at an angle of 120°. There was no movement of the joint in its new position. The skin was extremely rough and in places ulcerated, and could not be got into an ideally healthy condition before operation.

Operation was, however, undertaken, and the joint was excised on the 22nd September, 1924, though the chance of lighting up old sepsis was very great. I carefully isolated the rough, ulcerated skin area by gauze and then by an elliptical incision got down to the lower end of the femur, the lower curve of the ellipse sweeping across the upper edge of the head of the tibia. About 2 in. of the femur was sawn off at right angles to the shaft. The upper end of the tibia was sawn off parallel to the articular cartilage.

The sawn-off surfaces were then gradually brought into apposition by extension and afterwards by light strokes of a mallet. The sharp projection at the posterior edge of the tibia could not be smoothed up, owing to the gross pathological displacements and the proximity of the popliteal vessels in the mass of dense adhesions. The subsequent course of the case shewed that the spur did not exert any injurious pressure over



Fig. 1.—Photograph of patient on admission.

the vessels or the sciatic nerve. The weight-bearing surface of the femur was about $\frac{3}{4}$ in. less than that of the tibia, as I was obliged to go somewhat high up the shaft. The patella was excised, the soft parts stitched up after careful hæmostasis, and the skin united. No drains were put in and the limb was kept on a straight back splint. The stitches were removed on the 8th day, and a week later the limb was encased in plaster of Paris. The plaster was removed after seven weeks on the 23rd November, 1924. Before the plaster casing was finally removed massage was employed from time to time to keep up the tone of the muscles.

The result of the operation has been a synostosis in the most useful position—that of full extension. The shortening is about 3 in., but this has been overcome by a wooden patten with laced leather uppers (like that of a boot). The patient can now easily walk without crutches and

even without the patten, though in the latter case he tilts his pelvis down on the affected side, as



Fig. 2.—Skiagram of the knee-joint before operation.



Fig. 3.—Final Result.

was demonstrated at a clinical meeting of the Calcutta Medical Club on the 26th March, 1925.

Note by Major W. L. Harnett, F.R.C.S., I.M.S.—I saw this case with Dr. Ray Chaudhuri last autumn. The limb was a horrible sight, with two inches of the femur sticking out, covered by unhealthy, ulcerated skin. Amputation looked the only course, but the patient was in good condition, and after weathering such a storm of sepsis it seemed likely that his immunity would be high. So we decided on conservative measures; amputation could always be done later in the event of failure.

The result has fully justified our view, and Dr. Ray Chaudhuri is to be congratulated on the admirable limb which has resulted.

A NOTE ON THE TREATMENT OF TROPICAL ULCER.

By J. F. JAMES,

MAJOR, I.M.S.,

Civil Surgeon, Naga Hills, Kohima.

THE number of names given to this condition serves as an index of its wide-spread nature. It exists in Assam under the name of Naga sore. Its identity is easily established by finding the fusiform bacillus plus the spirochæte with the microscope.

It is generally conceded that its effective treatment is often difficult. This, indeed, is apparent when the list of remedies recommended is reviewed. Formalin, carbolic acid, mercury, chlorinated lime, iodoform, silver preparations, bismuth and others externally; salvarsan, antimony and iodides internally.

I have treated many cases during the last few months with uniform success by means of wet dressings of magnesium sulphate. A thickness of lint or rag of about a quarter of an inch, soaked in a 25 per cent. solution, covered with plantain leaf or oiled paper and a bandage suffices. The sore cleans rapidly and the dressings are continued until healing is complete.

For very foul sloughing cases two or three hot permanganate baths daily are a useful adjunct.

The action of this drug is more than merely osmotic. Common salt for instance is of little use.

Magnesium sulphate has the following advantages:—it is cheap, non-poisonous, simple to use, painless, and in my experience efficacious. Incidentally it will be found useful for a variety of septic conditions.

The wet dressings must be properly applied, the waterproof covering must overlap sufficiently.

This point is stressed for the reason that many practitioners fail to realise that the essence of a wet dressing consists in its remaining wet.

Indian Medical Gazette.

JUNE.

THE MEDICAL EDUCATION CRISIS IN BENGAL.

THE General Council of Medical Registration and Education of the United Kingdom has recently withdrawn its recognition of the medical degrees of the Calcutta University in consequence of the refusal of the University to permit the Inspector of Medical Education to inspect the final examinations of the University. The reason given by the University for the refusal was that "it is not usual to grant permission of this character." The other universities have done everything in their power to comply with the recommendations of the General Medical Council, and even the Calcutta University recognised the right of the Medical Council to examine the teaching institutions, but when it came to the examinations themselves being inspected they refused as a matter of principle. Undoubtedly the University is quite within its rights in refusing outside interference with the examinations, and the only question for decision is whether the General Medical Council is not also within its rights in withdrawing recognition of the degrees. The position of the Council appears to be that it is obliged to satisfy itself as to the standards of the degrees which are recognised; if it is not satisfied the withdrawal of recognition is bound to follow. The Calcutta University takes up the position that the recognition of the degrees is a matter of reciprocity, and that recognition of *degrees* can "never mean inspection either of the colleges or of the examinations held under the auspices of the University." The syndicate of the University also points out that it was never directly informed that the recognition of the degrees depended on inspection of examinations such as is carried out in the case of the examinations in the United Kingdom which have always been inspected by the Council. The Syndicate also believes that the prestige of its examinations will not suffer by the withdrawal of recognition, and that the graduates of the University will be at no disadvantage as compared with those of the recognised Universities of India.

There are sharp differences of opinion on these points and perhaps it is because of the misgivings which are being felt by the prospective graduates that the Syndicate assures

them that the necessary steps are being taken to ensure that the recognition of the degrees will be continued by the General Medical Council. The hard fact at present is that the recognition has been withdrawn, and unless the Privy Council can be moved to force the hands of the General Medical Council, it now becomes a question of restoring the recognition which has been withdrawn, not of continuing an existing recognition.

The Syndicate believes that "until its efforts are finally successful, such students who graduate from the University will still be able to appear at the final examinations of the Conjoint Board of the Royal Colleges of Surgeons and Physicians in England and qualify themselves for practising in England and sitting for the I.M.S. and all the higher medical examinations." This assurance must be very comforting to the young medical men who have feared that their prospects have been seriously compromised by the action of the Calcutta University, but they would be still more relieved if they had the assurance of the authorities of the Royal Colleges of Surgeons and Physicians on the point at issue. They will also feel that it would be desirable to have the assurances of the Governments and local bodies of the other provinces of India that their degrees will be accepted on terms of equality with the degrees of the Universities which are still recognised. There will, in fact, be great anxiety on their part until the doubtful points have been cleared up and until the Calcutta University has taken the promised steps to ensure the recognition of their degrees. It is obviously most unsatisfactory that the graduates of the Calcutta University should, through no fault of their own, be kept outside the great brotherhood of medical graduates of the British Empire. Many of them are inclined to the view that it would have been wiser and more tactful of the University to have followed the same course as the other Universities of India and to have allowed the inspector to see their examinations: the question of the right of the Medical Council to inspect the examinations could have been settled afterwards. If the Syndicate has acted properly and can ensure the continuance of the recognition it will be absolved from blame, but on the other hand if the Medical Council was acting within its rights in demanding the inspection, the disabilities suffered by the students will be regarded as being due to the action of the Syndicate. The Syndicate might very well take up the position that it does not care whether the degrees are recognised or not, and that it desires to escape once for all from the irksome restraints which are involved by outside control. If it takes up this attitude it will only have to obtain the approval of the medical

students of Bengal and there will be nothing more to be said.

The students, however, are by no means likely to agree with this view, they are inclined to say that it is all very well for the existing graduates who already are in possession of all the privileges which result from recognition of their degrees to ride the high horse, their interests are not at stake; but that is no reason for jeopardising the prospects of the coming generation of medical men in Bengal.

Some go so far as to say that if the wise counsels of the lamented Sir Ashutosh Mukherji had still been at our service such an impasse would never have been brought about.

There is no use in crying over spilt milk; what is needed is to rectify the harm that has been done, and it is hoped that the Calcutta University will act in such a way as to protect the interests of their students without regard to legal points which are notoriously liable to prove broken reeds to those who rely on them.

The latest information which is available is that the Committee of the General Medical Council has considered the remonstrance of the Calcutta University, and its request that the recognition of the degree should be continued until November next. The Committee has passed a resolution stating its inability to recognise, for the time being, the medical diplomas of the University of Calcutta as furnishing a sufficient guarantee of the possession of the requisite knowledge and skill for the efficient practice of medicine, surgery and midwifery, but that it would welcome and give most careful consideration to any further information on the subject.

This resolution, while it gives ground for hoping that the Calcutta degrees may again be recognised, is cold comfort to those who are going up for the final examinations during the present year, and it is to be hoped that their unfortunate position will receive the most earnest consideration of the Calcutta University.

It is interesting to note that the Irish Free State has passed through a crisis in some respects similar to that experienced in Bengal, and the solution of the difficulty has just been brought about by the action of the Free State Government which authorises the General Medical Council to exercise authority in respect to medical practitioners in the Irish Free State. The Bill is for the period of one year, but evidently there is greater anxiety on the part of the Free State authorities that their practitioners should continue to enjoy the same privileges as their colleagues in the United Kingdom.

SPECIAL ARTICLE.

THE INSECT MENACE.

On January 16th, 1925, in connection with the Indian Science Congress held at Benares, a joint meeting was held of the Medical Research, Agricultural, Zoological and Botanical Societies; and a combined discussion took place on the subject of "Insects and their relation to diseases in man, animals and plants."

The discussion was opened by Lieutenant-Colonel F. P. Mackie, O.B.E., M.D., F.R.C.P., F.R.C.P.S., I.M.S., who reviewed our knowledge of the problem as it affects man. His address has already been published in the *Indian Medical Gazette* for April 1925, p. 172.

The following gentlemen continued the discussion from their respective points of view:—

1. T. Bainbrigge Fletcher, M.A., Imperial Entomologist.
2. S. K. Sen, Assistant to the Imperial Entomologist, Veterinary Laboratory, Muktesar.
3. Lieutenant-Colonel S. R. Christophers, C.I.E., I.M.S., Director, Kala-azar Commission, Indian Research Fund Association.
4. E. A. Andrews, Entomologist, Indian Tea Association.
5. J. T. Edwards, Director, Imperial Veterinary Laboratory.
6. P. B. Richards, Entomologist to the Government of the United Provinces.
7. Professor A. Howard, Indore.

Below we publish the verbatim text or abstracts from the speeches at the discussion.

THE IMPORTANCE OF ENTOMOLOGY TO INDIA.

By T. BAINBRIGGE FLETCHER, M.A.,
Imperial Entomologist, Pusa.

To the vast majority of people the fact that insects are small animals is practically equivalent to the idea that they are therefore of small importance. This idea, however, is quickly dispelled by even a small realisation of the numerous ways in which the activities of the insect world affect man and his possessions. Such activities are especially evident in a country such as India, where seven-tenths of the people depend directly for their livelihood on the produce of their fields, which produce is ravaged by insect pests both before and after harvest, and where such a vast aggregate toll is taken by insect-borne disease, both amongst man and his domestic animals.

Limitations of time prevent any detailed statements, but it will be useful to indicate very briefly a few directions in which insects are of importance to us in India.

Agriculture forms the ultimate foundation of the whole wealth and prosperity of the Indian Empire. As the poet puts it:—

"Great is the sword and mighty is the pen,
But greater far the labouring ploughman's blade,
For on its oxen and its husbandmen
An Empire's strength is laid."

Now practically every cultivated plant that is grown in this country is subject to attack by insects throughout the whole period that it is in the ground. Some insects feed openly on the leaves or suck the juices, whilst others lead a concealed existence boring in the buds, leaves, shoots, stem or even in the roots. The damage done is often only evident on close inspection—although occasionally, as in the case of attack by locusts or by swarming caterpillars, it may be highly spectacular—but it is none the less real because it is not very conspicuous or because it is taken as a matter of course by the farmer. It is usually computed, by those who are in the best position to judge, that the annual damage to agricultural crops by insects is about ten per cent.:

that is to say, the farmer who reaps what he considers to be a normal full crop, actually gets only nine-tenths of what he would have got had there been no damage by insect pests. Some four years ago I made a rough calculation, based on the acreage figures of crops and the value of the out-turn, and estimated the annual average value of the out-turn of agricultural crops in India as Rs. 1,682,42,73,000. Applying the ten per cent. rule to this figure, we get an annual loss due to crop pests of one hundred and eight crores in round figures.

It is not only during their period of growth that crops are attacked. After harvest the products, and food grains in particular, are damaged by insects, so much so that elaborate precautions have often to be taken to guard against such losses, which must be enormous in the aggregate throughout the whole country, although it is impossible to state any definite figures, and in the case of food-grains we may include damage under the heading of stored products under the ten per cent. rule applied to the growing crop.

Besides agricultural crops, there are roughly a quarter of a million of square miles of forest in India, of which roughly a half is workable. Omitting the unworkable half altogether and remembering the time that it takes for a forest crop to mature, we shall probably be well within the mark in placing the average annual loss by insect pests at a minimum figure of Rs. 100 per annum per square mile, which gives us another one and a quarter crores to add to our bill against the insect world.

Now we come to the various insects which carry disease to man and animals. Taking the human diseases first, we have those which we know to be wholly insect-borne, such as malaria, plague and elephantiasis; some which we suspect to be carried by insects, such as kala-azar and leprosy; and some which are at least partially spread by insects, such as cholera. Plague, which, as everyone knows nowadays, is carried by rat fleas, carried off a total of 10,254,221 people in the twenty years 1898-1918, or on an annual average of over half a million. The annual deaths from malaria are probably in the neighbourhood of one million, and another hundred thousand may be ascribed to other insect-borne diseases, giving us a total death roll of 1,600,000. It is difficult to put a money-value on this loss, and it must be remembered that the figures given are totals of all degrees and ages in the population and that probably the larger proportion are not wage earners; so that we may estimate a modest value of Rs. 100 per life, which gives us a figure of sixteen crores. The losses to the wage-earning capacity of the people by sickness and disability are also very large but quite incalculable.

Next we have the cattle, on which the whole cultivation of the country depends, and other domesticated animals, whose total money-value may be estimated at Rs. 47,79,50,000; taking the losses in live-stock and animal labour or produce (hides, milk, flesh, eggs, etc.) due to premature death, debility or damage caused by arachnids and insects at 8 per cent. of this total value, we find an annual loss under this head of nearly four crores.

The Army always bulks large in the Indian budget and an army, to be ready for action, must have a certain amount of reserve stores, of which a large proportion is composed of articles subject to attack by insects, such as clothing, blankets, saddlery, etc.—all of which are liable to insect attack—besides provisions and fodder which we have already considered under the heading of stored products. In connection with transport also the Army is directly concerned with such problems as surra and other insect-borne diseases of transport animals. Incidentally I may remark that the most suitable containers for the charges of heavy guns are made of silk, which is of course an insect product, and that lac, which is another insect product, and at present practically a monopoly of India, was very

extensively used during the great War as a varnish for the interior of shells.

Most of you have come to this Congress by rail and have passed over railway lines which are laid on wooden sleepers, whose upkeep and renewal forms a very appreciable factor in railway finance. Nowadays most of these sleepers are treated to prevent attack by termites (the so-called "white ants") which in many localities will destroy untreated sleepers in the course of a few months. Some fifteen years ago certain Indian railways imported very large numbers of sleepers made of Australian wood which were reported to be immune to attack by termites in Australia. Be this latter fact as it may, it is very certain that the Indian termites had no such dislike, but positively revelled in the hountiful feast of Australian wood so kindly provided for them. The idea that more than one kind of termite was concerned and that wood which was immune to termites in one locality would not necessarily be immune in another locality to termites of quite different species and tastes, was one which apparently did not occur to the railway officials concerned; but had expert entomological opinion been taken in the first place, it is more than probable that the heavy losses which were actually incurred would have been avoided.

It is impossible to mention even briefly all the ways in which insects affect our everyday life, but such are a few of the directions in which damage by insects affects the welfare of the State. Totalling the figures for insect damage to crops, stored products, and forests, and due to insect-borne diseases of man and animals, we reach a figure of at least two hundred crores of rupees which are annually lost to the resources of this country through insect pests.

Now you may ask, what are we doing about it? What steps is Government taking to prevent or lessen this enormous wastage of the national wealth? And it must be admitted in answer that the steps which are being taken are quite inadequate to the magnitude of the problem concerned. At present the Government maintains twelve entomologists for the whole of India; and in addition there is one—not in Government employ—maintained by the Indian Tea Association. Of this total of thirteen, six are employed under Agricultural Departments, two at the Forest Research Institute, four under the Medical Department, and one in the Zoological Survey. Further, these thirteen men are stationed in nine different places, which means that they require nine separate laboratories, libraries, collections, staffs, etc. Hence there is no co-ordination of work and there is considerable waste of funds and effort. What is required, in my opinion, is a centralisation of work and staffs, at least so far as research work is concerned, in order that a strong co-ordinated central staff, dealing with both pure and applied problems, may be in the best position to turn out work which will be at once a credit and a benefit to the country as a whole. Such a scheme for a Central Entomological Institute, staffed by an Indian Entomological Service, has already been submitted to and approved of by Government, but has been shelved indefinitely on the ground of financial stringency. If, however, there is such financial stringency, it would seem to be truer economy to make a really serious attempt to check the present enormous wastage of the national wealth of India caused by insect pests; and if we, by a study of insects and by practical application of the knowledge gained thereby, can save even one per cent. of the present losses, such a saving would more than justify the most complete expansion of entomological work that we can possibly imagine.

INSECTS AND THEIR RELATION TO THE DISEASES OF MAN, ANIMALS AND PLANTS.

By S. K. SEN.

Assistant to the Imperial Entomologist.

ALTHOUGH it is customary to accord the insect pests of domesticated animals a subordinate position as

compared with those of man and plants, the entomological aspects of an animal pathology in India raises itself to a position of paramount importance by reason of the fact that in India agriculture and hence the very livelihood of the people depends on cattle. But whilst medical entomology has made rapid strides during recent years, and has now placed itself on a footing where it can assure itself of a future fraught with great possibilities, very little appears to be on record to hear evidence of any organized efforts having been made in India to elucidate the aetiology of even the most important diseases of live-stock, in the propagation of which arthropod vectors are likely to be concerned.

It is not possible to present, within the small compass of this abstract, a resumé of the present position with regard to all the diseases which are or may be transmitted by arthropods, and in what follows an attempt is made to indicate the present position with regard to the important diseases only:—

(a) Diseases due to protozoal parasites:

(1) *Surra*.—The causative organism, *Trypanosoma evansi*, has been proved to be mechanically conveyed by *Tabanus striatus* (Mitzmain; Shilston and Patel, 1919) and by various other species of *Tabanus*, notably *T. albocaudatus* (Cross and Abdulla Khan, 1921). In 1921 Cross and Patel published results to prove that the disease was cyclically transmitted by the tick, *Ornithodoros crossi*, Brumpt, but Yorke and Macfie (1924), in Liverpool, repeated the experiments with infected ticks, with negative results.

(2) *Piroplasmoses*.—In another paper presented to this Congress ("The Piroplasmoses of Cattle in India: A Preliminary Note") reference has been made to the fact that an examination of about three to four thousand blood smears at the Muktesar Laboratory during the last two years has revealed that infection with *Babesia bigemina*, the causative organism of Texas cattle fever (the so-called "red-water"), which is conveyed by ticks, is extremely widespread in India and that infection with *Theileria mutans* is almost as common; and since *T. mutans* is morphologically almost indistinguishable from *T. parva*, the causative organism of East African Coast fever (also conveyed by ticks), the subject of ticks merits considerable attention in India.

(3) Amongst other diseases of animals in India—although comparatively of minor importance—reference may be made to canine piroplasmosis (the so-called "malignant jaundice") of dogs, transmitted by the tick, *Rhipicephalus sanguineus*; to canine leishmaniasis, supposed by some to be conveyed by the flea, *Ctenocephalus canis* (although this possibility has been very recently discredited by Nicolle and Anderson); to spirochaetosis of fowls, conveyed by the tick, *Angas persicus*; and to pigeon malaria caused by *Hamaphysalis columbae* which has been shown to undergo its developmental cycle in the dipterous insect, *Lynchia maura*. Reference may also be made to the trypanosomiasis of sheep, in which the causative organism undergoes its developmental cycle in the sheep-ked, *Metophagus ovinus*, the infection occurring, as has been very recently (1924) shown by Hoare, *per as*.

(b) Diseases due to filterable viruses. *Rinderpest*.—Except for a few inconclusive experiments carried out by Curasson (1922) in Poland with certain species of ticks and *Tabanus*, little appears to have been done to test the possibility of arthropods acting as vectors of rinderpest. During the last two years, however, a long series of attempts has been made at Muktesar to transmit the disease by means of *Aedes* (*Stegomyia*) *albopictus*, *Musca domestica* and *Linognathus vituli*, but the results have been negative. These experiments form the subject of a more detailed communication presented to this Congress.

(c) Diseases due to bacterial organisms.—As is well known, with the notable exception of *Bacillus pestis* which, for the purpose of multiplication, usually chooses

the special cultural medium furnished by the stomach of the flea, *Xenopsylla cheopis*, bacterial organisms are not generally adapted to any highly specialized environmental conditions, so that the same species of bacterium may be amenable to conveyance by widely different species of arthropods. In a country extremely rich in insect fauna, such as India, the possible role played by various species of flies in the transmission of such diseases, as anthrax, becomes, therefore, a matter of serious import, particularly in view of the findings of Mitzmain (1914) and Morris (1918) which prove that the disease is capable of being mechanically transmitted by several species of both biting and non-biting flies, almost all of which are of common occurrence in India. At the same time, the presence of a close morphological similarity between the hæmorrhagic septicæmia organisms and the plague bacillus is of obvious significance as to the probable character of the invertebrate host, if any, involved in the propagation of the former disease.

(d) Diseases due to metazoan parasites.—Considerable advance has been made during recent years in our knowledge regarding diseases caused by the grosser parasites. As examples of diseases almost exclusively confined to animals, and in which arthropod vectors are concerned, mention may be made of cestriasis caused by "bots" in the stomachs of equines, "warbles" produced by various species of *Hypoderma*, "lousiness" caused by Mallophaga, and equine habronemiasis transmitted by *Stomoxys* and *Musca*; the last-named condition—which has been dealt with at greater length in another paper presented to this Congress—is of considerable interest to India at the present moment, in view of the possibility that the so-called "bursati" of India may prove to be, in reality, a form of cutaneous habronemiasis, variously known in other countries as "summer sores," "esponja," etc.

Whilst agricultural entomology is of little immediate concern to the veterinarian except in so far as it relates to the insect pests of fodder, the results of far-reaching significance already achieved in the domain of medical entomology, through the classical researches of such men as Manson, Ross, Breinl, Noguchi and Bacot, must continue to be the main source to which veterinary workers must turn now and again for analogy and for guidance as to the manner in which investigations upon the entomological aspects of animal pathology may be pursued with profit. There is a growing recognition of the essential solidarity of pathological entomology and of the necessity of intimate co-operation amongst the units engaged in investigation upon its various aspects. As an example of a disease of immediate concern to India, the investigation of which calls for the active co-operation of both the medical and the veterinary departments, mention may be made of canine leishmaniasis in relation to human kala-azar. Reference may also be made to the investigations that are in progress at Puri (Orissa) upon the relationship of human filariasis to the various forms of filarial affection of animals; whilst a number of diseases could be named (such as anthrax and myiasis) which are capable of being produced both in man and animals through the agency of the same species of insects; and, finally, the question of resistant animal hosts functioning as reservoirs of viruses continues to be a subject of surpassing interest for the medical and the veterinary worker alike.

In conclusion, it may be pertinent to remark by way of general observation that, in view of the great uncertainty that frequently attaches itself to the question of the exact specific identity of the lower organisms, the occurrence in the alimentary tracts or the tissues of insects, of parasitic bodies suspected to be the developmental forms of known pathogenic organisms, can only be of very limited value as a factor in the elucidation of the aetiology of a disease, and the verdict as to the complicity of any species of insect in the propagation of a disease must depend on the extent to

which the actual production of the disease may be effected by means of transmission experiments. In this connection the immediate desideratum would appear to be the standardization of the technique employed in transmission work, as experience has shown that the various methods of experimentation advocated are frequently very crude and, at times, extremely laborious. During the last two years, at Muktesar, critical experiments have been carried out with a view to deciding upon the comparative merits of the various methods recommended, and efforts have been made to evolve a technique suitable for use in transmission experiments with mosquitoes and non-biting flies.

MAN, ANOPHELES AND THE MALARIA PARASITE IN RELATION TO THE FAUNAS.

By S. R. CHRISTOPHERS, C.I.E., O.B.E.

LIEUT.-COLONEL, I.M.S.

ONE of the most remarkable facts in connection with animal life on the globe is the existence of the zoogeographical realms, or as one may prefer to express it, of the faunas. To the systematic zoologist the world faunas are so obvious a fact that he seems often to take them for granted, leaving the explanation of their existence to the future. The medical man goes further and ignores them altogether. I have recently been much puzzled to know whether anthropologists also prefer to ignore these natural kingdoms that have their boundaries almost as precisely set as any political state; it is certainly difficult to find in most recent writings any reference to the distribution of man from the stand-point of that of animals, a relic perhaps of the day when man was considered as above and apart from the rest of creation.

In the malarial cycle we have three distinct animals concerned, man, anopheles and the malaria parasite. It would be remarkable if faunal relationships did not enter into the cycle somewhere. Before going further perhaps it would be well to refer with the greatest briefness and in very general terms to the main features of the existing world faunas.

Extending over most of Europe, Asia and North America is the vast Holarctic realm representing apparently the newest order of life on the globe, divisible into the Nearctic or New World region, and the Palearctic or Old World portion. Occupying South and Central America is the old and isolated Neotropical realm, and in the tropical Old World the Ethiopian and Oriental regions, which together might be termed the Paletropical realm. In many respects a very distinct region lying between the Palearctic and the Paletropical is the Mediterranean region, embracing North Africa, the south of Europe and a tract of country extending far to the east of the present Mediterranean Sea. There remains the Australasian realm, recognised the oldest and longest isolated of all the realms. The limits of these regions and realms are too well known to require treatment here. I need only emphasize the fact that they are thoroughly well known to systematic zoologists, who largely think in terms of their faunas, and point out how far the trio of forms now under discussion, man, anopheles and the malaria parasite, appear to conform to them.

The working out of the distribution of the species of Anopheles has shown that this tribe or genus exhibits in a high degree what may be called typical faunal relationship. No special Anopheles fauna can as yet be ascribed to the true Australasian realm. It is true certain species are special to it, but they are almost certainly a later extension, just as Australian man can scarcely be in any way connected with the original isolation that preserved the marsupial mammalian fauna. A neotropical Anopheles fauna is, however, very obvious. Of the sub-genera into which recent work has divided the Anopheles, one is entirely confined to South and Central America, another is not

represented at all, whilst the third occurs in a special form in this area. The Palearctic region is largely characterised by a paucity of species; either the sub-genus *Myzomyia* has never penetrated so far, or it has been eliminated, possibly by climatic changes. The paletropical realm is characterised on the other hand by a great development of the sub-genus *Myzomyia*, which appears to be the most modern form of the genus *Anopheles*. From the point of view of the distribution of *Anopheles* this realm is divisible into (a) Mediterranean, (b) Ethiopian, (c) Oriental, and (d) an Australasian extension. These areas are as a rule represented by distinct but nearly related forms. Thus in the case of a particular group of *Myzomyia* the Mediterranean region has *A. hispaniola*, *A. multicolor* and *A. superpictus*; the Ethiopian region, *A. cinereus*, *A. transvaalensis* and others; the Oriental realm, *A. turkhudi*. Nevertheless there are some general features characteristic of the different regions, the group *Neocellia* being especially developed in the Oriental region, whilst *Cellia* and *Myzomyia* in the restricted sense are specially developed in the Ethiopian and Mediterranean; the annules group is Australasian.

Anopheles then conform very markedly, indeed, to the general character of the distribution of animals as worked out mainly in regard to the mammals. We may regard the appropriate groups of *Anopheles* as integral portions of the great world faunas.

Coming to the relationship of man to the faunas, I am at a disadvantage in that the study of man is a highly specialised subject and one on which I must speak with great diffidence. Were the facts, however, regarding the distribution of man presented to a naturalist in the rough, I do not see how he could fail here also to recognise a close adherence to the general plan of the great zoogeographical areas. Presumably there is no Australasian man in the true sense of his presence in Australasia; as in the instance of *Anopheles*, man must here represent a recent extension into this area, though possibly relatively ancient in respect to the history of man. Also it seems almost certain that there is no true Neotropical man. Representative of the Paletropical subdivisions, however, there appear to be certain distinct forms of man as follows: (a) Ethiopian, Negro and Negrito; (b) Mediterranean, Hamitic and Semitic races; (c) Secondary Australasian, Australian and Tasmanian man. In respect of Oriental man there would seem to be a nice question at issue as to whether this region is truly represented or not. Probably, if represented at all, it is a late stage in this fauna with which man is connected, not the fundamental groundwork.

The great bulk of the human race, apart from the African type, would appear to be Holarctic, if not purely Palearctic; viz., Caucasian and Mongolian man. These races, like the Palearctic fauna in general, would appear to be rapidly extending and to have largely populated the Oriental region. I am here, however, on ground where I have not the necessary qualification of knowledge to guide me. That the relation of man to the faunas has not been more expressly dealt with seems, however, to me so remarkable that, perhaps rashly, I have commented on the fact.

A relation of Negrito man to the "African" type of fauna seems possible, even if he were a very late development in this fauna, and he seems to have passed with it out of Europe and elsewhere, much as did some of the animals with which he is still associated. It is a fascinating but perhaps dangerous surmise to wonder whether man's early history was not a natural part of some at least of the great world faunas, and whether these may not represent in turn passing and oncoming geologico-faunal phases. But I must leave such considerations to those more competent to deal with them and pass on to the third of our trio of forms, the malaria parasite.

Of the malaria parasite there are known at present three, possibly five, distinct species. We are entitled to ask whether these shew any relation to the human or anopheline faunas. Modern conditions and the increasing extension and admixture of races under the conditions of civilisation must undoubtedly have tended very greatly to obscure any relationship to man and it is doubtful if as yet any definite relationship to species of *Anopheles* has been ever demonstrated. Nevertheless the present distribution of the species of parasite is at least suggestive. It might add some incentive to more extensive and accurate observations if it were realised that there might be some trace left of the faunal distribution of these forms. Latterly there has been some reason to believe that the parasite recently described by Stephens as *P. tenue* is very characteristic of the Central Indian area, an area largely populated by aboriginal races. Whether any recognisable relation of human parasites to faunas can be traced is perhaps doubtful, but the wider recognition by medical and veterinary workers of the truly amazing fact of the great world faunas is at least much to be desired.

By E. A. ANDREWS.

Mr. E. A. Andrews said: We have listened to three very interesting papers giving an account of the relationships known to exist between insects and man and animals, and plants, respectively, but I should like to strike a different note, and speak, not so much of the relations existing between insects and plants, for I speak, of course, from the agricultural side, as of the factors affecting those relationships.

The speakers on the medical and veterinary sides have stressed the pathological nature of the problem, but the study of the relationships between plants and insects raises many pathological problems too, and when we compare the number of cultivated plants with the number of domestic animals, I think that, while admitting Mr. Edwards' claim that the field for investigation is much wider on the veterinary side than on the medical, we can claim that the field on the agricultural side is wider still.

The object of this meeting being to promote discussion, I do not propose to do more than give a general account of observations made in connection with the study of the insect pests of the tea plant, which we believe to shed a certain small amount of light on this aspect of the question, with the hope of introducing this point of view to a proper notice in the discussion.

Let us consider the case of two very common insect pests in our part of India, the cabbage caterpillar and the looper caterpillar of tea. The vegetable garden may be planted immediately alongside the tea area, yet the former is never known to attack tea and the latter is never known to attack cabbages. Why?

In this particular instance it is possible to beg the question by pointing to the extreme dissimilarity between the plants and the difference in systematic position of the insects, but when it is found, as we have found in the case, more particularly, of the arch-enemy of tea, the tea mosquito bug, that not only varieties of the same species, but individuals of the same variety, may behave towards the tea mosquito bug as the cabbage does to the looper caterpillar, while their neighbours succumb to attack, it is impossible to ignore the existence of whatever factor it is which determines the choice which appears to be exercised by the insect.

In such cases it is obvious that the determining factor lies, not in the insect, but in the bush, and it is by enquiries into the factors governing this phenomenon that we have been able to carry out researches to such an extent as to cause tea bushes which were already closed down by the pest to throw it off completely and continue to give copious flushes, while their untreated neighbours rapidly succumbed.

In considering a problem of this nature the first thing we have to realise is that the question we are considering is neither the insect nor the bush, but the reactions between the two. This reaction is of necessity governed, not only by the peculiarities of the insect, but also by the peculiarities of the bush. As soon as we adopt this attitude towards the problem we realise that all factors affecting both the insect and the bush must be taken into consideration, and that it is impossible to omit from consideration the effect on both the insect and the bush, of the environment in which they are situated.

Our observations must therefore be extended to include an exhaustive enquiry into the conditions of the environment, and their possible effect on both the insect and the plant. In the case of an instance such as I have cited, where bushes in close contiguity show differences in degree of liability to attack, it is obvious that the effect of environmental conditions on the insect must be similar in the two cases, and we are compelled to a study of the environmental conditions as regards their effect on the bush.

Since time is limited, and there are many present to express opinions, I shall not dilate upon this aspect of the matter, but shall confine myself to a sketchy outline of the results we have obtained to show the direction in which work based on these conceptions has tended.

The environment of a plant is complex, and there are many environmental factors which have to be considered. Some of these are:—the geographical situation, the topographical situation, the elevation, the exposure of the place, the provision of shade, windbreaks, etc., and the soil in which the plants are situated. All the foregoing can be controlled at the time of planting and govern amongst other things, the variations in temperature, humidity and so on, to which the plant is exposed.

Having planted our bush, however, it is still subject to seasonal climatic fluctuations, but, what is more important, and especially in cases where intensive cultivation is the rule, it is subject to considerable variation in the condition of the soil environment.

Our work has therefore included an extensive survey of soil conditions as affecting the well-being of the bush and the incidence of the pest, and to cut a long story short, it was as a result of these investigations that we were led to the conclusion that a shortage of potash in the plant, as compared with phosphoric acid, was conducive to more severe attack. Carrying the work further, we were able, by direct addition of potash to the plant, to bring about the apparently complete immunity which I referred to before. This might lead one to suppose that the obvious thing to do is to add potash manures to the soil, and this was of course tried, with the result that, although a transitory improvement was effected by this means in most cases, it was found that there appear to be more factors than one affecting the power of the bush to obtain potash from the soil.

The work is now being carried further, and attempts are being made to investigate the minutiae of the reactions between the insect and the plant on the one hand and the plant and the soil on the other, as a result of which we have already obtained indications that the hydrogen ion concentration value of the soil solution, and again of the sap of the plant appears to enter into the matter, while the relative proportions of different substances in the sap does appear to vary from bush to bush, even when they are in close proximity.

In this direction the work appears to be running more or less parallel to much of the work which is being done in the medical and veterinary sections, and I hope I have said sufficient to excite interest in this side of the question as it affects the point of view of the agricultural investigator, for from the results obtained on these lines not only by us, but also by investigators in other parts of the world, it would appear

that the field for investigation is not only a very wide, but a very promising one.

By J. T. EDWARDS.

Mr. Edwards stated that the field under discussion had been covered briefly from the veterinary standpoint in the paper read by his colleague, Mr. S. K. Sen. There was not much difficulty after listening to what had been already said at the meeting, in perceiving a remarkable analogy in the role of insects as concerned human, animal, and plant pathology. The parts played by the insect factor in human pathology as disclosed in Colonel Mackie's address were exactly of the same order as those enumerated by Mr. Sen in his summary, with the difference that the animal pathologist was concerned with a considerably larger field, in view of the greater number of host subjects exposed to attack. Again, what had been stated by Colonel Christophers in his interesting speculative discussion upon the geographical distribution of association among human beings, mosquitoes, and the various species of malarial parasites could be applied with the same suggestive implications to the widespread interdependence of three other zoological species, namely, cattle, ticks, and various species of piropasmas. Further, the role of minute defects in nutrition, through lack of adequate mineral substances in the soil, in depressing the capacity of resistance of the plant so as to render it susceptible to the attack of an insect parasite, as revealed in Mr. Andrews' illuminating contribution, had what seemed to be an instructive analogy in the cattle disease known in South Africa as *lamziekte*, a disease which also undoubtedly occurred in parts of India. Phosphatic deficiency in the soil, and hence in fodder grown upon enzootic areas, led to the establishment of abnormal craving in the cattle, which were thus addicted to consuming decomposing bones strewn upon the pastures infected with a powerful toxicogenic bacillus, probably often conveyed by blood flies to the carcasses. The Imperial Entomologist had endeavoured in his paper to furnish a monetary computation of the losses annually sustained by India from the depredations caused by insects parasites and although the losses caused among live-stock were held to be large, they represented but a small fraction of the total losses sustained by agricultural interests. The speaker nevertheless contended that the loss was much greater than could be fairly represented in such figures, for disease in cattle meant serious hindrance to the cultivator anywhere, irrespective of the nature of the crop grown, in much the same way as outbreaks of the fly-borne disease of horses and camels known as *surra* might result in the immobility of armies. Numerous examinations at Muktesar during recent years had indicated that cattle in India nearly everywhere harbour vector-transmitted parasites, but the exposure to this attack seemed to be of such long standing that they were locally largely immune (piropasmas, trypanosomes). Disease directly due to insect attack (maggots or myiasis) caused widespread losses. It seemed that a clear case had been made for supporting the Imperial Entomologist's scheme for the centralisation and enlargement of the entomological resources of the country, and thus for the establishment of an organisation from which the investigator working upon pathological problems could seek trained entomological assistance.

By P. B. RICHARDS.

Mr. P. B. Richards said he had anticipated from the subject of the discussion that this would centre on insects as vectors of diseases of animals and plants. A broader line had, however, been taken by the agricultural contributors to the discussion which may be justified if they are permitted to consider insect-pest attack as, in itself, a disease, in which case pest insects in the aggregate might be said to be the worst disease from which plants suffer. This view was not so far-fetched as it might at first appear. The effect of disease

was to produce pathological conditions in the organism attacked. Insects certainly did this to the attacked plants. Analogies with animal pathology might, perhaps, be admitted between scale insects and skin diseases, insect-formed galls and tumours, mining and boring insects and myiasis. Sucking bugs in the course of piercing plants to abstract the juices broke down cells and vessels to a considerable degree. It was but one step further to the injuries inflicted by biting insects which removed plant organs in part or completely.

As instances of insects serving as vectors of specific diseases of plants, Mr. Richards cited the conveyance of fungus diseases into *Hevea brasiliensis* by the timber-nesting white ant, *Termes gestroi*, and by shot-hole borers, in Malaya; bud-rot into coconut-palms by *Oryctes rhinoceros*; and the probable relation between mosaic disease of potatoes in India and small sucking bugs.

The Imperial Entomologist in his paper had estimated the loss to agricultural crops at 10 per cent. This aggregated to an enormous sum, but Mr. Richards thought it might easily prove an under-estimate even of direct damage. For example in the United Provinces the loss of cotton crop on account of pink boll-worm attack alone appeared to be over 25 per cent., representing a loss of two and a half crores of rupees a year.

He feared there must inevitably be a certain toll taken by insects upon agriculture. The rate of toll would vary for different climates, crops, and peoples. Below a certain percentage loss for each set of conditions, remedial treatment would be uneconomic. But where the percentage loss is high, as in cotton, rice, stored potatoes, stored grain; or when a product of high commercial value is attacked, as tea; or individual plants of considerable value are injured, as coconut-palms by beetles, control measures were strongly to be recommended. He felt, however, that at present in India a great deal of the loss was unpreventable and that generally it was not a sound economic proposition to treat field crops under the present conditions of Indian agriculture. Methods of control for pest-insect pests had been evolved, but even where they were sound economically their application was limited by the ignorance of natural history, by the prejudice and, not least, by the poverty of the cultivator.

Hope might perhaps spring from the idea arising out of Mr. Andrews' work on tea, and from Mr. and Mrs. Howards' investigations at Pusa, that insect attack may prove to be a concomitant of ill-health due to some deficiency in the plant or unsuitability in its environment. The control of insect damage would then resolve itself in the future into growing "healthy" plants.

By A. HOWARD.

Mr. A. Howard said: During the last twenty years I have often observed the extraordinary degree of resistance to insect attack exhibited by plants when the right variety is cultivated and when suitable methods of agriculture are employed. On the other hand, unsuitable varieties and improper treatment are frequently followed by an epidemic. A collection of varieties of the same crop obtained from various tracts often contains types which differ greatly in immunity and susceptibility to disease. These differences are sometimes associated with the relation between the root-system and the soil-type. An interesting example occurred at Pusa in 1921, when certain deep-rooted varieties of a pulse, known locally as *Khesuri* (*Lathyrus sativus* L.), were attacked by green-fly. In that year, deep-rooted varieties from the black soils, shallow-rooted types from the alluvium, as well as kinds with an intermediate root-system from the Allahabad District, were sown in the same plot. All the types from the black soil area were badly attacked by green-fly, all those from the alluvium were immune, while the types with intermediate root-development were only slightly affected. Although the infected and disease-free plots were often side by side, in no case did the *Aphides* leave the deep-rooted cultures and attack those with shallow

roots. Really healthy plants seem able to keep insects and fungi at bay and their juices seem unsuitable for the nourishment of these organisms. It is sometimes possible to alter the juices of a plant very rapidly by suitable treatment of the soil and to bring about great changes in resistance to insect attack. Thus at Quetta in the case of the almond and the peach, heavy winter irrigation was found to render these plants exceedingly susceptible to the attacks of green-fly, while normally grown trees side by side were practically immune. Deep cultivation and thorough soil aeration after the green-fly attack developed, were followed by greatly increased resistance to the disease. The first-formed leaves on these trees showed extensive damage by the pest, the late-formed foliage on the same trees was normal and perfectly healthy. The disease never spread from the old to the new leaves. These examples, of which many others could be quoted, suggest that the attacks of parasites only follow mistakes in the choice of varieties and in agricultural treatment. The experience of the sugar planters in Java certainly falls in with this view, which, if established by more examples, will lead to parasites being regarded not as pests to be destroyed but as very valuable indicators provided by Nature, for checking the proceedings of the agriculturist. The appearance of a pest in agriculture may merely show (1) that the wrong variety is being grown; (2) that the crop is being grown in the wrong way; or (3) that Nature did not intend it to be grown at all.

The discussion was continued by other members throughout the day's session and was of much interest.

The President concluded the meeting by expressing his thanks to those members of his and other sections who had so kindly contributed to the discussion. He added that he was sure they would all agree that a most interesting and instructive meeting had been held, and speaking for himself he could say that his outlook on the whole subject had been widened. It was interesting to see how similar the problem was which each branch of science had to face and particularly how much of value was contributed to the problem by agriculturists who had relatively simple problems to face. One truth which emerged was that the "Soil" was at least as important as the "seed" and this applied to human problems as much as to those of animals and plants. If men, animals, and plants were well fed and lived an hygienic life, they were much less liable to the ravages of insect-borne disease or to those caused by bacteria than those whose constitution had been undermined by unhealthy conditions of life. That, in a nut-shell, is the modern outlook on the problems of disease transmission.

Current Topics.

"Medical Discovery."

A few extracts are given from a stimulating address by Sir Ronald Ross on "Medical Discovery." This was printed in full in *Science Progress* for January, 1925.

"What strikes us most in the picture are first the amazing extent and yet the slowness of the advance; and secondly, its intermittent or, rather, its undulant course. How many centuries have elapsed since our ancestral species first descended from the trees and took to hunting on the hard ground, not even the palaeontologists can tell us with certainty: evolution itself is a part of discovery, unconscious or conscious. After that, weapons, habitations, and clothing were, we may opine, the earliest discoveries; and then came crops and herds, fire, boats, and wheeled vehicles, the

use of animals for draught or riding, fortifications, villages and cities, and social ordinances. We are not disposed to contemplate with pleasure or pride the earliest members of our own profession, the 'medicine men' of savage tribes; but nevertheless they must have been not only the first physicians but also probably the first priests and philosophers.

"Our knowledge of ancient Egyptian, Sumerian, Indian, and Chinese medicine is very small; but advances in all these countries were apparently periodic, though, I fancy, they were probably much greater than we can now judge from the very few inscriptions or books on medical subjects which survive. For example, the great Indian medical works were compiled within the second to the seventh century A.D., and showed considerable knowledge. It is not true that—as has been claimed—Susruta (fifth century) attributed malarial fever to mosquitoes; but these books indicate some discrimination of many diseases, including diabetes and also the use of many drugs; and they describe a hundred and twenty-one surgical instruments, many of which 'were properly handled and jointed, the blade instruments sharp enough to cut a hair and kept clean by wrapping in flannel in a box'—to quote from Dr. Fielding H. Garrison's admirable 'History of Medicine' (Saunders, 1917).

"This was, of course, after the great period of Greek and Alexandrian sciences, from which much of the Indian medical learning (like Indian mathematics) was quite possibly derived—though Indian physicians and surgeons were well recognised as early as the time of Alexander. Both the Greeks and the Indians seemed to know that rats are connected with plague. The Greeks certainly connected malaria with marshy soil, and were able to distinguish the tertian, subtertian and quartan varieties; and Empedocles of Agrigento in Sicily was said to have cleared that town of malaria by removing its marshes as early as the fifth century B.C. (I suspect that the reason why he threw himself into the crater of Etna was because of his disgust at the indifference of his countrymen towards anti-malaria measures). I need scarcely discuss Hippocrates (460-370 B.C.) here, but may repeat the old complaint that ancient medicine went very slowly after his time. Nevertheless there was some considerable advance after him and with the Alexandrian anatomists to Galen (A.D. 131-201), whom also I need not particularise. The whole period lasted about seven hundred years, and then the sun of medical science set for nearly thirteen centuries, except for those faint reflections of its ancient glory which still haunted that long night. Now observe another fact. The entire epoch of Graeco-Roman medicine produced only a few men who added materially to medical science. The excellent chapter of Dr. Garrison's work, for example, which deals with this epoch, contains only eighteen black-letter names, including Hippocrates and Galen, in the whole seven centuries.

The revival of learning, or rather of discovery, commenced in the fifteenth and sixteenth centuries, nearly thirteen centuries after the death of Galen; and was at first largely concerned with refutations of that somewhat imaginative writer. The original observations of the new era began with those of the great Italian anatomists, Vesalius, Eustachius, Fallopius, and Fabricius, who re-constructed the science in the sixteenth century. Harvey published his demonstration of the circulation of the blood in 1628; and the microscope, the telescope of biology and medicine, began to be used by Kircher, Hooke, Swammerdam, van Leeuwenhoek, and Malpighi shortly afterwards. In the latter half of the same century (the seventeenth) Redi disproved 'spontaneous generation.' Towards the end of the eighteenth century Jenner's great discovery of vaccination opened up the study of immunity against disease; and in the nineteenth century Lister, Pasteur and Koch created bacteriology; Kuchemister, Leuckart, and Laveran developed parasitology; and rapid advances were made in every branch of medicine. In

Dr. Garrison's book the names of the men who made the leading advances in medicine are entered in black letters, and on counting them we obtain the following results:—During the century and a half from A.D. 1450 to 1600 there are 46 names; during the seventeenth century there are 79 names; during the eighteenth century 122 names; and during the nineteenth, 446 names. There are altogether nearly 700 names in the four and a half centuries from 1450 to 1900. During the same period many thousands of millions of human beings have lived and died throughout the world; and yet only about seven hundred of them altogether have added materially to medical knowledge. Secondly, nearly all of these seven hundred lived in the comparatively small proportion of the world's surface included within Italy, France, Britain, Holland, Belgium, Scandinavia and Germany. Thirdly, these men were only a small proportion even of all the medical practitioners who had lived during the same period—there are more than thirty thousand medical practitioners in Great Britain to-day; but fourthly, many of the most important advances (such as those of Jenner, Lister, Koch and Laveran) were made by men who were 'private practitioners' at the time.

"The proportion of medical discoverers in Dr. Garrison's list to the total population of the world is probably nearer to one in ten million than to one in a million as previously conjectured in this paper; and the proportion of them to all medical men is probably something like one in a thousand. But this gives rather a false estimate of the real work which is being done in medicine—to-day at least. If we count only the generals of an army, that army will be but a small one. Actually an immense amount of work is being turned out daily by the rank and file, though medical history can take cognisance only of the leaders; and we have but to read our copious contemporary medical press to convince ourselves of this fact. A very large proportion of the medical profession of to-day add something, however small, to the store—contribute their mite to the mass of knowledge, lay a brick or two to build the magnificent palace of science. We are apt to overlook this constant but almost inappreciable accretion. There are no strikes in the building trade of science. Day after day, year after year, the structure grows before our eyes. The men whose names appear in the medical anthologies are those who dug the foundations, or perhaps those who have completed the towers and the pinnacles; but it is the thousands engaged in treating the sick who have actually raised the walls of that august temple.

"I remember that before the war several of our colonies laid it down among the duties of their medical officers that they should 'engage in research.' What an easy rule to make! The popular notion is that a man has only to glance through a microscope in order to find something new. A friend of mine once said that the world looks upon any doctor as a person who, on returning home after a hard day's work, pulls out his watch and exclaims, 'Ah! I have half an hour to spare before dinner. I will just step down to my laboratory and make a discovery.' As a matter of fact it is impossible for most busy practitioners to indulge in such a time-wasting and often fruitless or nerve-wracking pursuit as deliberate, meticulous, and exigent investigation. What many of them really do, however, is to collect an enormous mass of observations on the symptomatology, the pathology and the treatment of diseases; and it is on this basis that the most important advances are made by subsequent diligent laboratory work or brain work. After all, the brain is the best and the last laboratory. Observation is essential but, by itself, is not enough: we have to co-ordinate observations. The ultimate object of science is not merely to make and to record observations, but to classify them in groups, and then to show that one group of them depends upon another group—that is, to solve problems. For example, many surgeons had studied, described and despaired over septic wounds; but it was Lister who

discovered how septic wounds were caused and could be prevented. Long before Jenner, milkmaids and farmhands believed that if they acquired cowpox they would not acquire smallpox; but it was Edward Jenner who co-ordinated such statements, tested them experimentally and created vaccination. Science requires not only observation but proof, and not only proof but explanation. Now, it is one thing to make observations, but quite another thing—and usually a much more laborious process—to verify them and to explain them.

"To put it briefly, medical discovery is to us human beings even the most important of all kinds of discovery, as defined in this paper. Yet to judge from the public attention given to it, it is the least important. Men seem to pass it over as if it were of no consequence; they hand it over in mass to the 'doctors'; and they are good enough to subscribe almost no money to the prosecution of it. The total fund now allotted for medical research in Britain consists of about £130,000 a year given to the Medical Research Council; and something like (I cannot ascertain exactly) the sum of another £50,000 a year for pure medical research, as distinct from teaching, provides for the numerous research laboratories and institutions. The total would amount to about £180,000 a year, if I am not far wrong. What a gigantic sum this is—what a generous contribution from this wealthy State to the science which is concerned with the life and health of all the people! Think of it; £180,000 a year! That is to say, one penny per annum given by each living person in Scotland, England and Wales. What generosity! For this gigantic penny every one hopes to have his life prolonged to at least the maximum of the three score years, and ten laid down by the Psalmist. Think of it again; during seventy years each person will have given seventy pennies, that is a total of 5s. 10d. for this cause. In the meantime every such person will have given many pounds to pay for his politicians, his army and navy, his local municipal affairs, and his education.

"The truth is that the mass of the people do not in the least even yet recognise the effect of medical discovery. I see from the Annual Report of the Medical Officer of Health for the County of London for 1923 that in 1841 the average expectation of life for every individual in London was 34.6 years among males and 38.3 years among females; and, that this period was prolonged last year to 53.8 years among males and 59.1 years among females. This means that the average length of life has now been prolonged by twenty years, that is by more than half of what the average length of life used to be in 1840. Of course, many factors have been concerned in this wonderful addition to life, but I think that one of the most potent factors has been the general increase of medical knowledge during that period of eighty-three years. Now perhaps if this fact can be violently rammed into the thick head of the general public, it might produce some effect upon the tightly drawn purse-strings of the same. If the public some day acquires sufficient sense, it will largely increase its contribution for medical science. I think that we doctors could easily arrange to spend on medical research a sum of not only £200,000 a year as at present, but of quite £1,000,000 a year; and what is more, the general public would really benefit by the expenditure—which is probably not the case if the public expenditure were to be correspondingly increased in many other lines, such as politics or even education.

"It is true, I think, that medical discovery does not require the supreme intellectual ability which is needed for astronomy, physics and mathematics. Archimedes, Descartes, Newton, Laplace, Clerk-Maxwell, Kelvin, and the modern relativists possessed or possess, I believe, a more intense intellectual fire than the moderate heat needed for medical, and indeed for any biological studies. The reason for this is that, at least up to the present, biology requires observation rather than calculation—it has more to do with the collection of facts than with exact measurements and induced predictions. But it is a mistake to suppose, as is often done, that

any one and every one can equally and easily achieve biological and medical discovery. True, many important medical discoveries seem to have been made simply by good luck; but we are apt to forget the earlier years of toil and disappointment which generally preceded, and were only finally crowned by that good luck. Now any one can have good luck or bad luck; but not everyone is willing to face the previous years of effort. Medical discovery, like all discovery, requires two rather rare qualities—an acute instinct for the right direction, and a burning perseverance in following it up. Now in my opinion these qualities are possessed only by a few individuals; and—what is more—it is impossible to know whether any individual really possesses them until he has actually succeeded in his quest. We cannot isolate and detect the future discoverer by any known qualities—by his success in examinations, by the height of his brow, or by the cut of his collars. For these reasons I have always argued that the best way to encourage discoveries in the future is to keep at work, by whatever means you can, the few men who have actually achieved discoveries in the past; and this is by no means always done, at least in Britain, at present.

"Those who rule us never seem to gather wisdom in this respect. They like to leave all such investigations to be carried out by doctors at their own expense. For example, the solution of the malaria problem cost the Indian Government a sum of no less than £240 in the years 1898-99; and all the recent advances in tropical medicine—advances which were probably greater than those in any other branch of medicine in the same period—cost the world's governments somewhat similar sums. We doctors and other men of science may congratulate ourselves on one point, namely, that almost the whole of medical discovery has been made by ourselves without help from anyone and at our own expense. Let us boast about it and blow our own trumpets—because no one seems willing to do so for us, and much less to pay us for our work! The cancer problem is being cleared of many of its surrounding difficulties, but it still remains impregnable. Advance is not as quick in many lines where we expected triumphant issues years ago. For example hookworm disease can be easily cured in the patient but by no means so easily in the community. Though Leishman and Donovan found the cause of kala-azar twenty years ago we have failed to ascertain how it is carried; and I could spend an hour in discussing the victories which we have failed to make, just as I have already spent an hour in discussing some of those which we have made."

A Conversazione at Parel Laboratory.

THERE was a large and distinguished gathering at a conversazione held at the Bombay Bacteriological Laboratory, Parel, on February 20th, 1925, under the auspices of the Grant Medical College Society and the Bombay branch of the British Medical Association. His Excellency Sir Leslie Wilson was the principal guest of the evening, and Major-General A. Hooton and Sir Temulji B. Nariman and others were present.

The following is the text of Colonel Mackie's address, as Director of the Laboratory:—

Your Excellency, ladies and gentlemen,

I wish to place before you a short account of the work which has been carried on during the last year at this Laboratory.

(I) The preparation of plague prophylactic is, perhaps, the most important of our duties, and the output during 1924 has been nearly 15 lakhs or one and a half million doses. Only twice in the history of the Laboratory has this number been exceeded. A charge of two annas a dose is made to Government agencies and native States, and four annas a dose to foreign countries; and it is estimated that during this year

Rs. 2,20,000 will be recovered by the Bombay Government under this head. This pays nearly two-thirds of the whole cost of staffing and running the Laboratory.

The vaccine besides being supplied to all parts of India is also sent to Iraq, British East Africa, China and the Persian Gulf.

From the opening of the Laboratory in 1896 till now nearly 25 million doses have been issued. From carefully collected statistics it appears that the reduction in mortality by prophylactic injection of Haffkine's vaccine is about 47 per cent. That is to say if 100 people contract plague, 85 of them will die if they have not previously been inoculated; whereas only 38 will die if they have been previously protected by Haffkine's vaccine. In addition to this, fewer persons will contract plague amongst those inoculated than amongst those not inoculated. On this calculation several millions of lives have been saved by the use of this vaccine—surely a splendid monument to the memory of Professor Haffkine and of the laboratory he established. Laboratories have been named after other great benefactors of mankind, for instance the Pasteur Institutes in Paris and elsewhere, the Lister Institute in London, so that there are good reasons for styling this "The Haffkine Institute" which should remind India of one of its greatest benefactors.

(II) *Diagnosis of plague in rats.*—The Laboratory is used by the municipal authorities for the diagnosis of plague in rats trapped or found dead. By this means the presence of a rat epizootic and the approaching rise of human infection may be forecast. During the year 700,000 rats were received of which nearly 250,000 were alive and 450,000 were dead; 326,291 were dissected and 3,774 were found to be plague-infected, i.e., 1.16 per cent. The number of infected rats is low in January but rises rapidly in February, March and April, when it may then reach as high a percentage as 7 or 8, and it then falls rapidly to 1 or 2 per cent. with the advent of the hot weather. This interesting phenomenon is not due to any appreciable changes in the rats, but is the result of the play of physical forces such as temperature and humidity acting on the rat-flea population.

(III) *Diagnostic examinations* for the information of civil surgeons, private practitioners and others are carried out in large numbers at the Laboratory. These examinations are in the capable hands of Assistant Surgeon Khan Bahadur Avari. A total of 2,065 such examinations were carried out by this department last year, of which 1,386 were for the serological diagnosis of syphilis. In addition to this, 240 tumours were reported on and the necessary guide to their operative procedures was in this way given to surgeons.

(IV) *The Chemical Department* is concerned chiefly in the bacteriological and chemical analysis of waters, of sewage effluents and other manufacturing processes, and in addition valuable research work was done by Dr. Goré on intestinal bacteria and on other problems of a like nature.

(V) *The snake venom work* is carried on continuously and may be regarded in part as the advertising department of the Laboratory in that it provides a *tamasha* which is witnessed by many distinguished persons who pass through Bombay. The venom so obtained is used for the production of antivenene which is prepared at Kasauli and used all over India; whilst laboratories in various parts of the world apply to us for their requirements of this valuable and dangerously-won commodity.

(VI) In addition to these activities, the Laboratory takes some part in *educational and propaganda work*, especially in connection with the epidemiology of plague, malaria, fly-borne diseases, tuberculosis, milk supplies, guinea-worm disease, rabies and disease-carrying insects. You may have noted, Sir, the exhibits which we sent to the recent Baby Week Exhibition, and similar assistance is given to exhibitions in other cities in India.

The preparation of lantern slides and cinema films fully occupies the time of the artist-photographer and his assistant, and these are loaned all over India for educational purposes. Medical men are sent by other governments and native states for short courses of instruction in subjects in which we have special experience and facilities. This educational and propaganda work is increasing rapidly and may be looked upon as one of the most valuable activities of the Laboratory.

Having reviewed briefly what we may call the routine work of the Laboratory, we turn to the special units; namely, the anti-rabic, the pharmacological, and the biochemical, the first named of which is a healthy infant of two years, whilst the two latter have come into being this year.

(VII) *The Anti-rabic Unit.*—Major Morison held charge of this unit until he went on leave on 14th April, 1924. We were able then to obtain the services of Assistant Surgeon La Frenais, who in addition to large experience of Pasteur Institute work has done valuable research work on this subject.

The advantages of decentralisation of anti-rabic treatment are many and are fully appreciated by the public who are spared long journeys by rail to Kasauli, and, what is still more important, are able to come under very early treatment which is so important a factor in reducing the mortality from this dreadful disease.

A total of 1,099 persons came for treatment and of these 108 did not complete the full course.

The number of persons who went through the course (580) is less by 265 than those of the year 1923, and this is due to the broadcasting of the vaccine to new treatment-centres which were opened during the year. Thus in 1923, 1,396 treatments were issued, whilst during 1924 2,811 were issued. This represents a 100 per cent. increase. The cost of a complete treatment of 14 daily doses has been recently reduced to Rs. 10.

There are now 24 treatment-centres to which patients may resort, thirteen of which are under the Government of Bombay and 11 of which are either under military or railway authorities or in native states.

The brains of 185 dogs suspected of having died of rabies, were examined microscopically, and of these 99, i.e., just over half were found positive to rabies.

Now that the anti-rabic unit is fully established and has proved its usefulness, it is highly desirable that house accommodation be provided on the premises for the officer in charge, Assistant Surgeon La Frenais.

(VIII) *The Pharmacological Unit.*—The department for the study of indigenous drugs was established during the year. The Revd. Father Caius, S.J., was appointed to the charge of the unit and entered on his duties as Chemist on 1st June, 1924. The pay of Father Caius was generously provided for the first year by the Governing Body of the Indian Research Fund Association and the working expenses of the unit have been guaranteed for two years by Your Excellency's Government.

Dr. Mhaskar, an Assistant Director of the Laboratory, was appointed to replace Dr. Turkhud and took over his work in association with Father Caius in the new unit on 14th June, 1924.

These two officers have already done some interesting work on the therapeutic value of indigenous drugs, viz., *Holarhena antidysenterica*, *Butea frondosa*, *Gymnema sylvestre*, and *Kino*. The first named appears to be a valuable remedy in certain forms of dysentery and diarrhoea and the second yields a substance toxic to *Ascaris* worm infection. Papers on these subjects were submitted to the recent Indian Science Congress at Benares, but are too technical to be referred to further on this occasion. Father Caius and Dr. Mhaskar are present in their laboratories to-day, and will be glad to show their methods and results to any medical men who care to pay them a visit.

(IX) *The Biochemical Unit.*—This laboratory has only just been opened (on December 15th, 1924), and the

equipment is still being unpacked and arranged. Here again we are indebted to the generosity of the Governing Body of the Indian Research Fund Association who have placed at our disposal a sum of Rs. 73,000 to which Your Excellency's Government has added Rs. 6,000 a year for three years. With the aid of these bequests I have undertaken to run the unit with a modified staff for three years without further cost to either body.

We are in need of a fully trained medical biochemist, and we have hopes of getting the services of such a one during this year. Meanwhile the work is being carried on by Mr. Malankar, who was trained in biochemistry at the Bangalore Institute of Science.

A commencement has been made in the study of the biochemistry of sprue, the different aspects of which disease are also engaging the attention of Dr. Fairley, myself and others in the Laboratory. The particular work which the biochemical unit will be called upon to carry out is the estimation of chemical changes in the excreta and the blood, and the functional efficiency of the liver, pancreas and intestines in this mysterious disease. It is hoped by such team work that important results may be obtained throwing light on the causation and prevention of sprue.

(X) *Research Work.*—In addition to the work already referred to, I must briefly speak of the research work which is being carried on by members of the staff over and above their routine duties.

Dr. N. H. Fairley, a whole time research officer, has continued his observations on Bilharzia worm disease, guinea-worm infection and on the serological aspect of certain tropical diseases, the latter being a line of work in which he is a pioneer. He is also associated with others in the investigation of sprue.

Dr. Naidu, also a whole time research worker, who has been appointed by the Indian Research Fund Association, has carried out with Assistant Surgeon Khan Bahadur Avari a large amount of work in connection with the plague prophylactic and the means of improving its immunizing power and of reducing the local reaction at the site of injection. These researches are likely to yield important practical results.

Dr. Goré is still engaged in unravelling the complicated problem of the intestinal bacteria.

Captain Malone has been engaged on another aspect of the plague problem with the object of measuring the degree of immunity produced in animals and man by the inoculation of Haffkine's plague prophylactic. This promises to provide a method which has long been required.

Assistant Surgeon La Frenais, with Dr. Avari, is continuing his researches on rabies.

Assistant Surgeon Chitré and myself have been engaged on the intestinal aspect of the sprue problem for over a year, and we have accumulated a large amount of information which is shortly to be published.

That summarises very briefly the principal activities of this Laboratory during the past year, and I can with some confidence assure Your Excellency that the high standard and well known reputation of this Laboratory is not only being maintained, but I believe improved, whilst the new units staffed by keen and able men will enable us to push forward the boundaries of knowledge to the improvement of our control over tropical diseases and of methods for their prevention and cure.

What of the future?—There is no need for me to emphasise the importance of research to an audience of medical men. It is to medicine what the intelligence branch is to the army, being at the same time the "eyes" of observation and the advance guard of progress.

Research which stops at the laboratory is of no practical use, and our aim here is to bring the results of research to the notice of the combatant ranks of the

medical army. That is the object of our meeting here to-day.

It is necessary that we should bring our results down to practical problems, and particularly that the results of research should be made applicable to the problems of public health.

This was the theme of my presidential address at the recent Indian Science Congress, and I emphasise it again.

A mobile unit.—An organisation with this end in view is badly needed in Parel, and I suggest the establishment of a mobile laboratory which should be prepared to proceed at once on the outbreak of an epidemic, just as a fire engine stands ready to dash to the site of a fire. It would be a simple matter to arrange this, and all it would require would be a suitably trained medical man to take charge of this unit.

When the nature of the epidemic has been determined, its mode of spread will, in many cases, be obvious, or, if not, this also can be investigated, and the doctor in charge of the mobile unit will be in a position to co-operate with the public health authorities in limiting it or stamping it out. Such a link or liason is badly needed between research laboratories and public health authorities. A unit of this sort has already been established in Madras where it has yielded valuable results.

Tropical School.—Your Excellency, and you, ladies and gentlemen, will be aware that an elaborate scheme for the establishment of a School of Tropical Medicine at Parel was drawn up by my distinguished predecessor, Colonel W. G. Liston. Through the generosity of Sir Dorab Tata it seemed likely that the necessary sum of money would be raised. Just as the scheme approached fruition the Incheape axe fell and the scheme had unfortunately to be abandoned. I hope, however, that it is merely postponed, and that when financial conditions are more favourable, one or more of the merchant princes of Bombay—a city already renowned for its public benefactors—will again come forward to provide facilities for higher medical education and thus remove from Bombay the opprobrium under which it lies in this matter. At present all our Bombay graduates have to go to Calcutta for their higher medical education, and this must be a reflection of a painful nature to the "first city in India."

In conclusion, I wish, for myself and my staff, to thank Your Excellency, and you, ladies and gentlemen, most heartily for your presence here to-day. You, Sir, in particular, because you are known to have the cause of medical advancement very much at heart, as your actions in many directions have already proved. We hope by eliciting your distinguished interest and by obtaining the support which your exalted position ensures, that the work of this Laboratory may be still further extended for the relief of suffering humanity.

Abstract from the "Times of India," dated 23rd February, 1925.

PAREL LABORATORY.

His Excellency, who made a short speech, said:—"On my own behalf and on behalf of the other guests who are present here this evening, I thank you for the welcome that you have been good enough to accord to us. I shall desire that the thanks are all on our side, for it is a real pleasure to us to have had an opportunity of visiting this Laboratory. I am quite sure you, gentlemen, expect me this evening to make an eloquent speech. I should be rash indeed if I merely attempted to deal with any technical subject before an audience, composed as it is, of men distinguished in medical research. I am expected to speak on a subject on which I know nothing at all, but I am a very frequent visitor to this Laboratory, and every visit that I pay here is a proof of the interest I am taking in this Laboratory. I wonder what Hippocrates would say

if he came back to the world again and visited this institution! It is an undoubted fact that as year passes year, as decade passes decade, medical science is making a progress, perhaps unparalleled in the progress of any other science, resulting in immense benefit to the suffering humanity and in the prevention of disease; and you, gentlemen, who have visited this Laboratory know what splendid work has been done by Lieutenant-Colonel Mackie and his staff."

After referring to the financial stringency from which the Government was suffering at the present time, he hoped that it would not be far distant when they would realise the scheme that was formulated before,—that there should be a School of Tropical Medicine in Parel. Surely if it was wanted anywhere in the world, His Excellency emphasised, the school was wanted in this Eastern country where they suffered so much. He hoped that those people who had been generous before would come forward to ease the financial position and help an object that was going to benefit not only Bombay but also the whole of the East. His Excellency was not, of course, in a position to make any definite promises, but assured them that if he could do anything that was possible in his power, he would certainly do it.

His Excellency, continuing, expressed his agreement with Colonel Mackie that it was a fact that the snake venom work might be regarded in part as popularising the Laboratory, in that it provided a *tamasha* which was witnessed by many distinguished persons. When one realised the enormous amount of work that was put through in the Laboratory every day by the anti-rabies unit, which was started only two years ago, and by the anti-plague department and the other activities of the institute, His Excellency thought that they in Bombay ought to be proud that they had in their midst such an institution, which was not only benefiting their city and Presidency, but was of immense value to the Eastern world. He also felt that the Laboratory had undoubtedly earned a very great reputation and was sure that it would continue to increase in future as it had done in the past. His Excellency offered his sincere thanks to Colonel Mackie and staff.

The Influence of Climate and Malaria on Yaws.

By G. C. RAMSAY, O.B.E., M.D. (Edin.), D.T.M. & H. (Eng.).

Jl. of Trop. Med. and Hygiene, Feb. 16, 1925, p. 85.

ACCORDING to Manson-Bahr in "Manson's Tropical Diseases," "Yaws is practically confined to the tropics and sub-tropics and even there, is absent at high altitudes, but owing to its great similarity to syphilis and the extent to which these two diseases overlap, it would appear to be impossible to define its exact limits."

Ramsay's experience in the Cachar district of Assam is that yaws is more prevalent among the hill tribes than it is among the inhabitants on the plains.

The district of Cachar is a low-lying plain broken up by isolated hillocks and surrounded by ranges of hills, varying from 2,000 to 6,000 feet in height.

The lesions of yaws as seen on the plains and foothills during the warm, steamy weather are typically text-book in the primary and secondary stages.

The extra-genital mother yaw, the minute yellow-pointed papular eruption, the furfuraceous desquamation, the warty ring-worm or circinate yaws and the foot lesions (crab yaws) are as typical in Cachar as in other yaw-infected countries.

The effect of climate on these lesions is remarkable; during the cold season on the plains it is a very rare occurrence to see frambœsial patients presenting typical yellow-crusts excrecences, but condylomatous-like lesions in the warm, moist regions of the axilla and between the nates, chronic dermatitis of the hands, desquamating and worm-eaten-like lesions of the soles of

the feet and occasionally painful joints all liable to be mistaken as syphilitic are what is usually seen.

As soon as the weather becomes warmer the characteristic yellow-crusts yaws may reappear with, on the advent of the warm, rainy season, the painful plantar lesions.

The effect of climate giving the lesions of frambœsia a syphilitic appearance is doubtless one of the principal reasons for diagnostic errors in colder latitudes.

Heat and moisture, but principally the former, appear to be the main factors in producing the characteristic lesions of frambœsia, for the cooler the climate the more do yaws and syphilis resemble each other.

In an experience of over 1,000 cases, tertiary lesions, with the exception of chronic dermatitis of the hands and desquamation, exfoliation and pitted worm-eaten-like appearances of the soles of the feet, are comparatively uncommon.

Superadded infection of ulcers with Vincent's bacilli and Schaudinn's spirochaetes converting the characteristics of the frambœsia ulcer into those of tropical sloughing phagedæna with occasional serious sequelæ is by no means rare.

Arthritis is seen in about three per cent. of the tertiary cases, the interphalangeal joints of the fingers being most frequently involved, but bone lesions (periostitis) have only been seen in six cases and on two occasions juxta-articular nodules were seen in patients with a history, but no other signs of yaws.

It is a very noticeable fact that in Cachar the tertiary lesions of frambœsia predominate amongst the residents on the cooler slopes of the surrounding hills and not on the warmer malarious plains.

Climate *per se* fails to explain this anomaly, for severe tertiary lesions are, according to Manson-Bahr and Spittel, extremely prevalent in the much warmer climates of Fiji and Ceylon.

When investigating the reasons for the comparative mildness of tertiary syphilis and the absence of parasymphilitic affections in this district, it appeared to me that repeated malarial infection might be the possible explanation, for coolies imported from a non-malarious district usually appear to contract a much more severe type of syphilis than those born and brought up locally.

Powell mentions cases of yaws where frambœsial eruptions subsided after contracting severe remittent fever, and again remarks that yaws is most prevalent in gardens where the incidence of malaria is least.

Powell mentions cases of yaws where frambœsial malaria, but believed that fever due to other causes has also a beneficial effect, and in his conclusions on the effect of pyrexia, writes: "The fever to produce satisfactory results should be of some days' duration."

From Powell's observations, from his own investigations from the fact that Fiji is non-malarious, Ceylon very slightly so, from the fact that tertiary yaws in Cachar predominates on the cooler and less malarious hills, Dr. Ramsay concludes that the prevalence and severity of tertiary frambœsial lesions depends upon the absence, incidence and degree of malarial infection in a yaws-infected region.

Encephalitis Lethargica.

By ALEX GARDNER ROBB, M.B., B.Ch., D.P.H.
(R.C.P.S.I.),

Medical Press and Circular, March 4, 1925, p. 173.

This paper deals with an epidemic which occurred suddenly and extensively in Belfast last spring and early summer. The outbreak began in March; few cases at first, a large increase in mid-April, and continued till the end of June, when the epidemic ceased even more suddenly than it began. Only one case occurred after the end of June. This seasonal outbreak coincides exactly with the one in 1920, which was the only other extensive epidemic in Belfast.

The total number of cases admitted during this recent outbreak was 183, and nine-tenths of these occurred

within the period of mid-April to mid-June. In this epidemic, however, the disease was diagnosed early and patients were frequently in hospital during the stage of excitement and insomnia. Stress was laid on the importance of mental excitement, insomnia and talkativeness and early symptoms.

In this epidemic the prominent symptoms at the onset were:—(1) Fleeting neuralgic pains; (2) nocturnal insomnia, often complete and lasting for several nights; (3) mental excitement and exaltation, great restlessness and talkativeness. A little later came (4) diplopia and other eye symptoms; (5) muscular twitchings; (6) delirium of varying degree; and later still (7) lethargy.

In many of the cases one or more of these signs were absent. In some cases the first symptom was acute pain in the axilla or in perineum.

(1) Neuralgic pains occurred in the large majority, commonly in scalp, over ears, neck, often to shoulders and arm, forearm, thumb, iliac crests, frequently later bilaterally; pain in the foot was usually later. Pain more marked when the foot was touched lightly, often disappearing with firm grip.

(2) Nocturnal insomnia: an early sign in the large majority.

(3) Mental excitement, restlessness and talkativeness; very common at the onset. Whistling was one of the accompanying signs in some cases.

(4) Diplopia was present in 73 per cent. of cases, generally occurred on the second or third day.

Squint, ptosis, nystagmus and partial loss of accommodation were frequent.

(5) Muscular twitchings occurred in some degree in 70 per cent. of cases; sometimes mild twitchings of the lips, some more severe and persistent, not of such an "abandoned" nature as in chorea. Myoclonic jerkings of abdominal muscles were common, often accompanied by much pain.

(6) Delirium occurred in 52 per cent. of cases, varied from low mutterings at night to severe maniacal states, usually only lasted for one or two days; they were not subject to night terrors. Hallucinations in several cases.

(7) Lethargy occurred at some stage in 72 per cent.; generally appeared second or third week.

Herpes occurred in 6 per cent. of cases, usually on the lips and nostrils.

Respiratory disturbances; polypnoea frequently noted both in early and late stages (60-80 or even 100 per minute).

Complaint of shortness of breath was frequent even in cases already several weeks ill. Rapid breathing sometimes remained as a sequela. Polyuria was common.

Cerebro-spinal fluid was examined in many of the cases, little variation from normal except an increased sugar content. Many estimations of sugar were made for him by Dr. J. H. Smith. It was found above normal in every case, no matter what the duration of the illness. This increase is a valuable diagnostic sign in differentiating from various forms of meningitis. If no increase then encephalitis is not present.

Same house frequently provided several cases. Some such cases separated by intervals of four weeks. No member of the hospital staff contracted the disease.

Paralysis of facial nerve was very uncommon.

Prognosis.—Previous epidemics have provided rather misleading statistics. Death-rate in the last epidemic was 11.4 per cent.

Dr. Robb expressed himself as very sceptical regarding the recovery rate, usually quoted 20 per cent. He estimated about 5 per cent. as being nearer the mark.

Riddoch has reported the results in 83 cases which recovered from the acute attack in the London Hospital. Examined at long intervals after discharge, "residua in almost all" (Hall), and said his own experience almost coincided with this. He was unconvinced that hexamine had any value. Sodii salicylate was of very little use for the pains. Paraldehyde of great value in free and repeated doses.

He was not impressed by results of fixation abscess. Diphtheria antitoxin improved one case, but in half a dozen subsequent cases had no effect whatsoever.

He was not impressed by intravenous injection of patient's own C.S. fluid, and was not satisfied that repeated lumbar drainage was of benefit.

Mosquitoes and Coconut Palms.

By W. E. HAWORTH, M.B., C.M., B.Sc.,

Transactions of the Royal Society of Tropical Medicine and Hygiene, October 1924, Vol. XVIII, No. 4, pp. 162-198.

THIS is an account of the running to earth—or rather tracking to the tree tops—of so many "Peter Pan" imps in the form of innumerable mosquitoes which otherwise had eluded all the vigilance of the author and his staff, who were engaged in making Tanga in Tanganyika Territory a pleasant abiding place. The meticulous care with which the axils of the coconut palm fronds were ascertained to be the site of breeding places for the insects is recounted, and among the more interesting detailed observations are the facts that the water in these breeding places persists for a very long time during the hot, dry season, and that the species found include *Culex fatigans* and *Anopheles costalis*: the latter was present in 58 out of 8,887 specimens. Dr. Haworth recommends the clearing out of palms from township areas as the only possible way of tackling the problem.

Reviews.

AN INTRODUCTION TO PRACTICAL BACTERIOLOGY.—By T. J. Mackie, M.D. (Glas.), D.P.H. (Oxford), and J. E. McCartney, M.D., D.Sc. (Edin.). Edinburgh: E. & S. Livingstone, 1925. Pp. 304. Price, Rs. 6-6 net or 8s. 6d. Obtainable from Butterworth & Co. (India), Ltd., Post Box 251, Calcutta.

WHEN the reviewer was a student he consulted his professor of pathology as to which book on bacteriology he should buy; the reply that he received was, "Don't waste your money on a book; all books on bacteriology are out of date before they are printed." In those days the few notes that one took in the pathology lectures and practical classes sufficed both for examinations and for all the practical laboratory work that the student was likely to do. Nowadays the case is somewhat different; the bacteriological kaleidoscope does not change quite so rapidly, but the whole field of bacteriology is so much more vast that, unless the student is prepared to spend months digging into the large textbooks on the subject, he must be provided with a handbook such as the one under review.

This book is written primarily for the use of students and is meant to be an introduction and a guide to practical bacteriological laboratory work; it is not meant to be an epitome of medical bacteriology. The authors have attempted to emphasise the more important methods used in routine bacteriological diagnosis, recommending those that they have found most useful in their own experience.

The authors have produced a book which should prove very useful alike to the fifth-year student, the post-graduate student and the practitioner. They have dealt with the whole range of practical bacteriology thoroughly, but at the same time concisely. They have not confined themselves strictly to bacteriology but have strayed into the subject of protozoology and have dealt with the laboratory diagnosis of such diseases as

malaria, amoebic dysentery and trypanosomiasis. This diversion is particularly welcome to the student in the tropics whose practical laboratory work is likely to consist of far more protozoology than bacteriology.

The book is well written, clearly printed, and of a very convenient size.

AN INTRODUCTION TO THE HISTOLOGY OF TUMOURS.—By H. A. Halg, M.B., B.S., D.P.H. London: Henry Kimpton, 1924. Pp. 128, with 28 text figures and 10 plates. Price, 7s. 6d. net.

THIS is an elementary work on the histology of tumours, designed apparently chiefly for students. With it is combined a brief description of some technical methods. In view of the fact that this ground is adequately presented to students in the well known textbooks of pathology, this work will only be of subsidiary assistance to them.

A slip has occurred on p. 55 where *Schistosoma hamatobium* is referred to as a nematode worm.

G. S.

LOCAL ANÆSTHESIA SIMPLIFIED.—By J. J. Posner, D.D.S. St. Louis: The C. V. Mosby Co., 1924. Pp. 114, with 55 illustrations. Price, \$3.50.

THE title of this book is well chosen inasmuch as it is written in very simple language, the technique is simple and the apparatus is simple. The photographs and illustrations are very clear and instructive and are easily the best we have seen dealing with this subject.

In the chapter on the instrumentarium we should like to have seen the use of curved needles mentioned, as we have met with many cases where it would be almost impossible to inject into the muco-buccal fold in the region of the upper wisdoms with a straight needle on account of a tight cheek or the inability to open the mouth sufficiently wide.

We also prefer to sterilize the syringe immediately before and after use by boiling and do not think it wise to put trust in such apparatus as a glass butter jar, as the author suggests, for safe custody after sterilizing after use until the syringe is required again.

Sterilized ampoules containing an old solution may be all right, but again the risk is present and not worth the while. It is much safer to make a fresh solution daily, using newly prepared twice-sterilized water, Ringer's solution tablets and Novocaine E and F tablets.

We should like to have seen more about the use of suprarenin, as there is no doubt that many of the toxic symptoms following an injection may be traced to this drug.

No mention is made of the importance of the solution being isotonic, a variation from which is the most common cause of after-pain and we think a chapter on the dangers, contra-indications and untoward effects could have been introduced with advantage.

The book is well printed on excellent paper and very free from errors, and should be of great help to the dental surgeon wishing to improve his technique, but we can scarcely recommend it to an inexperienced student.

NUTRITION OF MOTHER AND CHILD.—By C. Ulysses Moore, M.D., M.Sc. Philadelphia and London: J. B. Lippincott Company, 1923. Pp. 234. Price, 8s. 6d. net. Obtainable from Messrs. Butterworth & Co. (India), Ltd., Post Box No. 251, Calcutta.

THIS is a fascinating little book written for mothers, nurses, and social workers who have had a moderately good education.

The book begins with a most excellent chapter with photographs on vitamins, and proceeds to instruct as to the physiology of breast feeding and its advantages over any other method.

JUNE, 1925.]

There are many useful chapters on diet, and on the artificial feeding of young, premature, and sickly infants. Unfortunately most of the foods prescribed are unobtainable in this country.

PRACTICAL ORGANOATHERAPY.—By Henry R. Harrower, M.D. Fourth Edition. London: Endocrines, Ltd., 1922. Pp. 416.

THIS is an extremely interesting book, which will be found of most use to those who are practising physicians and who have not forgotten the intimate connection between physiological principles and clinical signs and symptoms. Dr. Harrower has specialised for the last ten years in producing the various products of the endocrine glands, and is so firm a believer in their potentialities that he has given us a book which from cover to cover is full of interest and suggestion. Dr. Crile, the eminent American physiologist, has stated that the crucible of the clinic is the only reliable method of testing the inherent value of any remedy.

If we are to believe Dr. Harrower, the treatment of 99 per cent. of infirmities is by the application or combination of ductless glands; we can only hope that the optimism of the Harrower Laboratory will prove as well founded as this publication is entertaining.

LECTURES IN MEDICAL JURISPRUDENCE.—By William Nunan, B.A., M.D. Bombay: D. B. Tara-porewala, Sons & Co., 1925. Pp. 162. Price, Rs. 5.

DR. NUNAN of Bombay has written an excellent little book on medical jurisprudence, which embodies his lectures as Professor of Medical Jurisprudence to the Grant Medical College. A short work on this subject was much needed, and his book gives an up-to-date description of the essential facts on which questions are likely to be asked in courts of justice. It is common knowledge that this is a difficult subject for the majority of students, requiring as it does common sense and powers of observation rather than academic information. He lays great stress on the importance of giving clear evidence: to describe the result of a post-mortem fully and clearly in non-technical language is no doubt an art, but it is an art which has to be cultivated in order to achieve success in this field.

He gives a very good instance of the danger of a medical witness expressing an opinion on quotations from books without first seeing the whole context. The quotation was "It is impossible, to a decade, to fix definitely the age of an individual." He, however, asked to see the book, and the concluding words of the sentence were "after the age of 25 years," which of course completely alters the meaning. The whole work is very well done, the chapters on wounds being perhaps the best. We think that a chapter on rape would have been worth including. This book is full of good things very clearly described and we can strongly recommend it both to students and practitioners.

LEPROSY.—By Sir Leonard Rogers, C.I.E., M.D., F.R.C.P., F.R.C.S., F.R.S., I.M.S. (ret'd.) and Dr. E. Muir, M.D., F.R.C.S. (Edin.). Bristol: John Wright & Sons, Ltd., 1925. Price, 12s. 6d. cloth; 10s. 6d. paper covers. Pp. 301. Illustrations 65.

THE appearance of this book has been looked forward with the greatest interest by all who knew that it was in preparation. Although most of the subject matter has already been published, either in the form of the Croonian Lectures by Sir Leonard Rogers or in articles by Dr. Muir in the medical journals, there has been a keen desire on the part of medical men to have an authoritative and complete account of the whole subject. Great as is the reputation of the authors, it will undoubtedly be enhanced by the book which they have now produced.

The disease is dealt with in a masterly and broad-minded manner and though necessarily much of the book deals with the personal work of the authors, there is never a lack of a sense of proportion and the views of other authorities are fully set forth.

The first three sections are mainly by Sir Leonard Rogers; these comprise a clear and lucid account of the history, distribution, epidemiology and prophylaxis of the disease, while the sections on aetiology, clinical description and treatment are chiefly by Dr. Muir.

Sir Leonard's account of the history and distribution of the disease is the result of immense labour and study, but the narrative is so clear and simple that the reader never has the impression of an encyclopædic work, but rather of a fascinating story. Throughout the pages there runs the thread of purpose; the thread has not first been woven and the purpose made to fit in with the ideas of the author, rather the facts are marshalled and the inevitable deductions are set forth. The contagiousness of the disease is clearly shown by an analysis of 700 cases from the literature; personal association with a leper stands out as the source of the disease in the great majority of cases and the special susceptibility of the young is established. The subject of prophylaxis is dealt with on sober and common-sense lines; the ideal method of early notification and immediate segregation are recognised as being utterly impracticable in most of the countries which are chiefly affected, but a practicable compromise is ably advocated. The chief measures which are discussed are:—

I. Compulsory notification; this is possible only in some advanced communities.

II. Medical Boards are necessary when compulsory measures are instituted. Their object is to secure accurate diagnosis and so to prevent unwarranted restraint of persons who are not lepers.

III. Compulsory segregation, where practicable, is the ideal, but in many countries voluntary segregation must play a large part. It is only in the case of children, who should be protected by law from associating with lepers, and in the case of persons who follow occupations which involve danger to the community that compulsory measures will be practicable in poor and backward countries. Home isolation is rarely successful, but when thoroughly carried out as in Norway, it has proved of great value.

IV. Examination of contacts to detect the earliest stages of the disease is recommended.

The organisation of leper colonies is fully dealt with and the conditions for success are clearly stated.

Leprosy clinics, to which early cases are attracted, are strongly advocated, and in many places these constitute the most hopeful of the practicable means of controlling the spread of the disease. The cure of early cases will attract patients to the centres for treatment and in this way the leper will be kept from progressing to the dangerous infective stage.

An essential factor is that the disease should not be driven underground and that the victims should not be ostracised, lest they be forced to conceal their disease in their own interests. The success of the Calcutta School of Tropical Medicine clinic shows that when patients are convinced that they can obtain relief, they will gladly come for early treatment.

The manner of infection is fully dealt with and though the question remains to some extent open, it is evident that the bacilli enter the body through the skin or nasal mucosa, probably through abrasions which are infected by material containing the bacilli, but possibly to some extent through the bite of some insects.

The important question of early diagnosis is fully and clearly dealt with, and any practitioner who reads this book and makes an honest attempt to follow the instructions which are contained in it should have no reason for falling into the common error of failing to recognise leprosy even in its early stages.

We turned with the greatest interest to the section on treatment, and our most sanguine anticipations have

been fully realized. The subject is dealt with on sane and broad lines, the tendency of the disease to undergo spontaneous cure is frankly stated, the great importance of general hygienic measures, especially of good food, exercise, fresh air and *hope* are emphasised. The doctor is warned that all other causes of ill-health such as syphilis must be thoroughly sought for and suitably treated.

We are not presented with a panacea for leprosy and asked to pin our faith to it to the neglect of everything else, but rather to attend first of all to the factors which help leprosy to progress and then to call in the valuable aid of the special forms of treatment which the authors have done so much to establish.

We have searched in vain for evidences of the unjustifiable optimism which has sometimes been attributed to exponents of the newer treatments; instead of this we have found an honest statement of what can be done and of what cannot be done by treatment.

It must be emphasised that all cases of leprosy are not curable; only patients who come for treatment early have any right to expect that their disease will be controlled, and even these must expect to continue treatment for long periods. Another point is that the treatment does not consist merely in the perfunctory giving of injections, but in the intelligent and persistent following up of each case and the adaptation of the treatment to the special needs of each patient.

Granted the combination of skill, perseverance and optimism, better results may confidently be hoped for than in cases of tuberculosis of similar severity; no one has any right to condemn as useless a line of treatment which he has neither understood nor tested.

Sir Leonard Rogers and Dr. Muir are still up against a hard task, but what they have already accomplished makes it easy to predict that nothing short of insane opposition on the part of the medical profession can prevent them from continuing on their victorious path.

The issue of this admirable book ought to play a great part in the waking up of the medical profession in India in the matter of leprosy; it appears at a very opportune time when an appeal is being made for the vigorous prosecution of a great campaign against the disease.

A KEY TO ANOPHELINE MOSQUITOES. A GUIDE TO THE RAPID IDENTIFICATION OF BOTH SEXES OF THE SPECIES OF INDIA, CEYLON AND MALAYA.—By C. Strickland, M.A., B.Ch. (Cantab.), Professor of Medical Entomology, Calcutta School of Tropical Medicine,—late Travelling Medical Entomologist, F. M. S. Government. Calcutta: Messrs. Thacker, Spink & Co., 1925. Pp. 13. Illustrated with lithographs, line blocks and text figures. Price, Rs. 2.

THIS admirable and excellently executed little work meets a long felt want. There are already several classifications of Indian anophelines extant; but some are tomes of considerable volume, others long series of articles in medical research journals, others scanty and non-illustrated tables on flimsy paper, liable to tear. This work is different; it is handy in size, complete, yet concise and lucid, easy for reference and admirably printed, whilst two beautifully executed colour plates illustrate the wing venation. Dr. Strickland on his title page quotes his modest aim—from the "Hunting of the Snark"—to be as follows:—

"It next will be right

To describe each particular batch,
Distinguishing those that have feathers and bite
From those that have whiskers and scratch."

In classification and identification Dr. Strickland relies mainly upon wing markings and the markings of the hind leg; the diagnosis being equivocal in only a few cases in which a reference to other structures is necessary. The illustrations are profuse and exceedingly well executed.

This little brochure will prove invaluable to many different classes of workers; to medical and post-graduate students, to medical officers, to malarial survey officers, and to tea garden doctors. The authoritative position which its author holds in this particular field is well known, and both he and the publishers are to be congratulated on the "next step forward" in medical entomology in India.

THE PNEUMOCOCCUS AND PNEUMOCOCCAL AFFECTIONS.—By L. Cotonl, C. Truche and Mlle. A. Raphael. English edition by D. S. Page, M.A., M.B. (Cantab.), D.P.H. and Eva Morton, M.R.C.S. (Eng.), L.R.C.P. (Lond.). London: John Bale, Sons and Danielsson, Ltd., 1924. Pp. 218. Price, 16s. net.

THIS monograph of some 200 pages represents a summary of the researches on pneumonia carried out in Nicolle's laboratory since 1908.

The subject is taken up under three headings:—(1) The pneumococcus; (2) Diseases of pneumococcal origin; and (3) The treatment of pneumococcal diseases.

In the first part the bacteriological aspect of pneumonia is thoroughly dealt with. The essential characters of the pneumococcus, the difficulties encountered in differentiating this organism from streptococci, and the relation between virulence and solubility in bile are clearly defined. The chapters on the types of pneumococci and the properties of anti-pneumococcal serum introduce a good deal of controversial matter, and explain the views held by the French in contrast with those of the American workers.

The second part of the monograph is well written and contains an invaluable section on the crisis in pneumonia in its clinical, biochemical and serological aspects.

The concluding chapters deal with specific therapy in pneumococcal diseases. The authors claim a large measure of success in the use of anti-pneumococcal serum prepared at the Pasteur Institute of Paris.

Prophylactic vaccination, vaccine therapy, and chemotherapy are only lightly touched upon.

The monograph contains a good bibliography.

Annual Reports.

ANNUAL REPORT ON THE HOSPITALS AND DISPENSARIES UNDER THE GOVERNMENT OF BENGAL, 1923. CALCUTTA: BENGAL SECRETARIAT BOOK DEPOT, 1924. PRICE, RE. 1.

MAJOR-GENERAL B. H. DEARE, C.I.E., I.M.S., was Surgeon-General with the Government of Bengal, except during the period 10th April to 24th November, when Lieutenant-Colonel D. McCay, M.D., I.M.S., and Lieutenant-Colonel A. B. Fry, C.I.E., D.S.O., M.D., I.M.S., held charge in turn.

Calcutta Hospitals and Dispensaries.—Twenty-four such institutions were working at the commencement of the year, and two more were opened during the year, viz., the Entally and Taltolla Municipal Dispensaries; 2,903 beds for in-patients being available during the year in the 17 institutions concerned. 40,755 in-patients and 375,264 out-patients were treated during the year, there being an increase in the number of in-patients as compared with former years, but a decrease in out-patients owing to the institution of charging small fees in the Medical College, Campbell, Sambhu Nath Pundit and Presidency General Hospitals. The death-rate among in-patients was much the same as in former years, 11.26 per cent.

Cholera was of mild character during the year; 1,402 in-patients with 274 deaths. Kala-azar shewed again a very marked increase; 5,599 patients treated as against 2,940 in 1922,—the results of increasing popularity in the antimony treatment and of more patients coming forward for diagnosis and treatment. Malaria was responsible for some ten per cent. of patients treated, whilst small-pox and influenza were of but little importance. Tuberculosis is of increasing importance; 3,251 patients as against 2,595 in 1922; whilst the incidence from venereal diseases is almost stationary. Surgical operations performed numbered 44,052, and important and selected surgical operations 7,731. A special report on the work of the Eden Hospital for the year shews how large a volume of obstetric and gynaecological work is carried out; 1,147 cases of confinement during the year with 32 deaths; and 567 major gynaecological operations.

The total income of hospitals of classes I, III and IV was Rs. 28,79,872, a decrease of Rs. 29,560 on the figure for 1922,—government contributions totalling 65 per cent. of this income. The total expenditure was Rs. 27,78,230, a substantial decrease on the 1922 figure. Careful and rigid—if almost meticulous economies—secured a substantial reduction in the expenditure on both medicines and diets;—a decrease perhaps admirable from the point of view of provincial finances, but deplorable from the point of view of the comfort of patients and staff.

District Hospitals and Dispensaries.—The number of these increased from 859 in 1922 to 914 in 1923, of which 27 were homeopathic dispensaries and 13 Ayurvedic dispensaries. In the western medical institutions 7,082,603 patients were treated during the year; no less than 2,101,954 of them for malaria. In-door patients numbered 61,975 with a mortality of 6.38 per cent. Influenza, cholera and small-pox were unimportant during the year, but venereal diseases and tuberculosis shewed an increase. Kala-azar shewed an increase to 34,264 patients treated as against 15,566 in 1922, as the result of better and earlier diagnosis and the greater willingness of patients to come forward for treatment. Mymensingh,—previously regarded as not infected,—is now known to be an endemic centre. The figures for leprosy also shewed an increase from 2,189 to 4,144 patients treated, for similar reasons. The total number of surgical operations numbered 132,409, and selected operations numbered 5,831.

Financially, the income of hospitals, etc., of classes I, III and IV was Rs. 19,77,842 as against Rs. 17,77,990 in 1922; and the expenditure Rs. 18,30,417 as against a corresponding figure of Rs. 17,44,891. Local funds contributed 47 per cent., and government funds 13 per cent. of the income. Subscriptions and donations realised nearly 19 per cent. of the income received.

The year was remarkable in fact for the rapid increase in the number of district and union board dispensaries, but the question of personnel still remains unsatisfactory; officers of assistant surgeon class having in many instances been replaced by sub-assistant surgeons; and the latter by private practitioners. The introduction of the practice of charging small fees has not been popular; whereas in some districts it has led to an increase in income, in others it has seriously interfered with the collection of subscriptions.

On the whole, the report records steady, but not remarkable increase in the medical and surgical facilities in the Province.

CONTAGIOUS DISEASES HOSPITAL AND MUNICIPAL OBSERVATION HOSPITAL, RANGOON. ANNUAL REPORT FOR 1923. BY DR. K. R. DALAL, L.M. & S. (BOMBAY), D.T.M., D.P.H. (L'POOL). RANGOON: THE TIMES PRESS.

The annual reports of these two hospitals are always interesting reading, as with a small staff and amid much hard work, Dr. Dalal manages to collect together

for publication many interesting clinical observations. In our review of his report for 1922 we commented on the scandal of having no electric light in a contagious diseases' hospital where intravenous transfusions for cholera may have to be given at any hour of the night; this year we are glad to read that electric light has been installed in the cholera ward (only) of the hospital; the reason for the apparent parsimony in not providing it throughout the whole hospital is that "there is every probability of a new contagious diseases' hospital being erected in the near future." We trust that the "near future" will not become the Greek calends, for a new and up-to-date hospital is apparently much wanted.

A second improvement during the year was the provision of a new separate latrine and separate washing and bathing platform for small-pox patients; and Dr. Dalal's mention of this leads us to wonder in how many infectious diseases' hospitals in this country do small-pox patients use the same latrine and washing and bathing places as the other patients in the hospital. It is all very well to segregate cases of infectious disease; but to compel the unfortunate victims of different infectious diseases to use the same latrine and bathing place is a little harsh. Fortunately, the year saw a small-pox epidemic in Rangoon, with resulting improvements in the hospital. As Dr. Andrew Balfour has pointed out in "Health Problems of the Empire" it usually takes the stimulus of fear of a present epidemic to secure sanitary reform on the part of municipalities. However, we do not suppose that it is any more risky to use a latrine recently visited by a small-pox patient, than to sit next to a small-pox patient in a Calcutta tram.

In commenting on the provision of staff, Dr. Dalal raises a thorny and difficult problem. In non-epidemic times all is *laissez faire* and matters jog along comfortably; a half empty hospital and a contented staff and establishment. When an acute epidemic of infectious disease breaks out, however, extra temporary staff has to be entertained,—often on a large scale,—and this temporary staff is wholly untrained; "the corporation has sanctioned on a liberal scale employment of extra hands in times of epidemic and sudden emergencies, but in actual practice it has been found extremely difficult to secure efficient hands in time to meet the increased demand," with the result that most of the extra strain falls upon the small permanent staff. On a larger scale, in connection with public health matters, this problem has been solved in the Madras presidency; the epidemiological staff is there and in training in the non-epidemic times, the services of its members being utilised in vaccination and other duties; once the epidemic commences they can be rapidly mobilised and are already trained. In connection with Dr. Dalal's hospital, we note that there is no reserve of any kind, not even a leave reserve, whereas in the official government services in India the leave reserve usually stands at a figure of 20 to 25 per cent. An increase of staff and establishment by some 25 per cent., we suggest, would be a useful measure of insurance against times of epidemics in such cases. Further, the best time to raise such suggestions is in the middle of a severe epidemic; once such an increase is sanctioned, it becomes the order of the day,—a precedent, something which cannot be altered.

During the year 1,535 patients were treated; the chief diseases concerned being small-pox, 609 cases; plague, 281 cases; and chicken-pox, 208 cases. The figure for chicken-pox is very interesting in view of the recent suggestion by several authorities that small-pox, "alastrim," vaccinia and chicken-pox are all in reality but modified strains of the same virus; some of these cases of chicken-pox, however, may possibly have merely been very mild small-pox. Male patients totalled 1,341 and females 194, whilst 1,205 of the patients were sent in by the public health authorities, and 330 were voluntary admissions. The total death-

rate from these severe diseases was 26.4 per cent., a figure which is very good when one considers how many moribund patients are sent to such hospitals; already dying of small-pox, plague, cholera or the like.

There were 285 admissions for plague during the year, with 187 deaths, but more than half the cases admitted were admitted on the 3rd or later day of illness, and 55 cases died within the first 24 hours of admission. Only 2 of the cases were of pneumonic type, but plague was present in Rangoon throughout the whole year, admissions occurring in every month from January to December.

Cholera was of but little importance, and accounted for 41 admissions with 24 deaths, including 2 cases found dead when the ambulance reached the hospital, and 12 other cases, more or less moribund on admission.

Small-pox accounted for 626 admissions, and was present throughout the year, but especially prevalent in March and April. Of the 626 cases, 343 had been vaccinated, and 38 of these died; a case mortality rate of 11 per cent.; whereas of the 283 unprotected cases 115 died, a case mortality rate of 43.6 per cent. There were no deaths in the modified and discrete cases, but mortalities of 39 per cent. in the confluent cases, and 89 per cent. in the hæmorrhagic ones. A table of incidence of small-pox during the past 13 years in Rangoon shews how the epidemic waves appear to recur every fourth or fifth year.

There were 95 cases of influenza pneumonia admitted during the year, most of them sent in by the port health authorities in a very bad state from incoming vessels. The death-rate was 18 per cent., a low figure considering the adverse conditions present. Fourteen patients were sent in with a diagnosis of plague, but proved on examination to be simple adehitis.

The total cost of the hospital was Rs. 65,773, of which Rs. 16,585 was spent in diet and Rs. 748 on sera and vaccines. Dr. Dalal comments on the high cost of anti-sera in India,—a matter of constant trouble to all hospital superintendents in this country.

Turning to special lines of treatment, cerebro-spinal fever is treated by lumbar puncture plus intrathecal injection of a polyvalent serum. The results were rather disappointing, 19 deaths in 23 cases; but the local strain of meningococcus requires to be investigated and typed in order to get the right serum. Intramuscular injection of calcium chloride proved useful in hæmorrhagic small-pox; whilst the use of Sir Archdall Reid's powder,—aspirin, grs. x.; phenacetin, grs. v.; and pulv. ipecac. co., grs. v.,—has been found useful in pneumonia and in small-pox. Despite the fact that many moribund cases were admitted the mortality in the plague cases was 65.6 per cent. as against a general case mortality rate of 96.8 per cent. for Rangoon in general. The question of serum treatment for plague was raised by a correspondent in the local papers during the year, but Dr. Dalal is not convinced that serum treatment is worth while, and quotes the following figures:—

CASE MORTALITY,
PER CENT.

| | Treated with serum. | Not treated with serum. |
|--|---------------------------|-------------------------------|
| | p. c. | p. c. |

| | | |
|------------------------------------|------|------|
| British Commission; 1913. | | |
| 222 cases treated; 222 controls .. | 66.2 | 73.9 |
| Dr. Choksy. | | |
| 200 cases; 200 controls .. | 63.5 | 74 |
| Rangoon hospital, 1922 .. | .. | 66.7 |
| Rangoon hospital, 1923 .. | .. | 65.6 |

Finally, an encouraging feature of the work at the Contagious Diseases Hospital is the increasing number of patients who come in voluntarily for treatment; these having numbered 21.5 per cent. in 1923.

At the Municipal Observation Hospital, which serves solely as an observation hospital for cases sent in from incoming steamers, there have been extensive structural alterations during the year, consequent on the operations of the Rangoon Development Trust; 2,495 persons were under observation during the year, of whom 64 per cent. were discharged as shewing no appreciable disease, after observation.

ANNUAL CLINICAL REPORT OF THE GOVERNMENT HOSPITAL FOR WOMEN AND CHILDREN, MADRAS, 1923. BY LIEUTENANT-COLONEL C. A. F. HINGSTON, O.B.E., I.M.S., SUPERINTENDENT, GOVERNMENT PRESS, MADRAS, 1924.

THIS report follows the usual lines and shews what good work this institution continues to do. 2,841 obstetric cases and 3,379 gynecological ones were treated during the year. There were 2,768 deliveries with 72 maternal deaths,—32 from accidents of child-birth, chiefly adherent placenta; 8 from puerperal septicæmia; and 32 from non-puerperal causes, chiefly anæmia; whilst the fact that only 2 deaths occurred from post-partum hæmorrhage speaks well for the care taken in conducting deliveries.

There were 40 cases of eclampsia among primiparæ and 24 in multiparæ, a total of 64. Of these no less than 36 were delivered by natural means, and 23 out of the 62 children were born living. The maternal deaths numbered 7, a mortality rate of 11 per cent. The blood pressure readings in some of these eclampsia cases were as high as 200 mm. and veratrine was freely used.

Of the 2,768 deliveries, 1,518 were natural; 371 difficult; 69 preternatural; 652 complex; with 158 abortions, of which 131 were incomplete. A table shewing the classification of obstetric operations resorted to gives some interesting figures as to the different indications for each; thus vertex presentation with difficult labour constituted the chief indication for podalic version with extraction; breech and foot presentations the chief indication for podalic extraction; and prolapse of the cord the chief indication for perforation of the head. There were 23 Cæsarian sections; 19 of them for prolonged and difficult labour, and 1 for eclampsia.

The total number of confinements shewed an increase of 40 cases over the figure for 1922, and was the largest on record in the hospital. Primiparæ numbered 27 per cent. and the number of confinements monthly varied from a minimum of 198 in April to a maximum of 271 in November. Hindu patients constituted 37 per cent., Europeans and Anglo-Indians 11 per cent., and Mahomedans only 2 per cent. In natural non-difficult labour, with a vertex or face presentation, the average duration of labour in 1,518 cases was 11.38 hours in primiparæ, and 8 hours in multiparæ. There were 52 cases of plural births, including a case of triplets; and 2,610 labours (excluding abortions) gave 2,658 children, of which 2,102 were full term.

On the gynecological side, much operative work was carried out, including 122 uterine ventro-fixations.

Colonel Hingston is to be congratulated on the increasing sphere of usefulness of the hospital, and the accumulation of observed facts on which to base improvements in technique and procedure.

ANNUAL REPORT OF THE UNION MISSION TUBERCULOSIS SANATORIUM, AROYA-VARAM (NEAR MADANAPALLE), S. INDIA, 1923-1924. MYSORE: WESLEYAN MISSION PRESS, 1925.

As yet but little in the way of organised effort is being put forward to deal with the terrible problem of tuberculosis in India,—a problem probably far more severe in India than in temperate climates. To this

rule, the report of the Union Mission Sanatorium at Madanapalle, and those of a few kindred institutions form honourable exceptions. The sanatorium was founded in 1912 and is maintained through the efforts of fourteen different missions. It covers 100 acres of ground, with more than 70 buildings, spacious grounds, and has a clear atmosphere free from dust. The climate is dry, with an average rainfall of only 28 in., and a temperature not exceeding 80°F. in the cold weather, and 102° in the hot weather. The institution also receives an annual grant of some Rs. 26,000 out of its total expenditure per annum of Rs. 96,000 from the Government of Madras. It is under the charge of Dr. C. Frimodt-Møller, M.B., Ch.B. (Copenhagen). The total available accommodation amounts to 140 beds.

During the year under review, 227 patients were admitted and 211 discharged, the daily average attendance being 128, with a long waiting list and the available accommodation taxed to its utmost capacity. Hindu patients predominate, but all races and castes are represented, as well as a miscellany of occupations and of ages ranging from 6 to 50 years: 66 per cent. of the patients came from the Madras Presidency.

Of the 211 cases discharged during the year, 45 had spent less than a month in the sanatorium, and may be excluded from the figures,—leaving statistics available for 166 cases. Of these 14 per cent. were in stage I when admitted; 26 per cent. in stage II; and no less than 60 per cent. in stage III; shewing how severe is the ordinary case of tuberculosis when admitted to hospital in India. Of these 166 patients, 34 were discharged with the disease arrested; 45 as much improved; and 39 as improved. Of stage I patients, 100 per cent. shewed improvement or arrest of the disease; of stage II patients, 88 per cent.; of stage III patients, 57 per cent. The average increase in weight in the whole group of 166 patients was 12 lbs.

Dreyer's vaccine was tried on 31 of the discharged patients. The conclusion is come to that the vaccine at least did no harm; all the cases treated were in stage III; and 4 were discharged as much improved and 16 as improved. Artificial pneumothorax was tried in 12 cases, but—owing to adhesions—only succeeded in 6 cases. This measure is only tried in cases which respond to no other form of treatment; hence the result of 5 cases definitely improved or much improved is very satisfactory.

During the year the laboratory facilities were extended, and biological section added; improvements to buildings and to the conservancy system were carried out; and two new special wards constructed. The whole report, in brief, tells of steady progress in the attempt to tackle one of India's most serious disease-problems, albeit on a small scale.

ADMINISTRATION REPORT ON THE JAILS OF THE BENGAL PRESIDENCY, 1923. BY LIEUTENANT-COLONEL F. S. C. THOMPSON, O.B.E., I.M.S., CALCUTTA: BENGAL SECRETARIAT BOOK DEPOT, 1924. PRICE, RS. 10-8-0.

IMPROVEMENT in several directions characterised the year in the jails in Bengal. The death rate, 15 per mille, reached the lowest figure ever recorded for the jails of the province, thanks to such measures as chlorinating the water supplies, fly-proof enclosures for cooked food, etc. Further, more space was available, as the daily average number of prisoners fell by about 1,500 as compared with the previous year, and political prisoners only numbered 33 at the end of the year.

Further recommendations of the Jails' Committee were brought into force, extra clothing having been provided for both male and female prisoners, rules framed for better hospital administration, female prisoners having been granted the concession of retaining

their children with them up to the age of 4 years, religious privileges being granted to Sikh and Mahomedan prisoners, and rules for the separation of adolescents guilty of grave crimes having been revised. The scale of dietaries was improved and rules regarding jail offences were revised,—solitary confinement being abolished.

Comment has been made by several Superintendents on the evils of the prevalent practice under the revised sections 109 and 123 of the Criminal Procedure Code of sending prisoners to simple imprisonment for failure to give monetary security. Discipline was far more satisfactory in 1923 than in the previous few years, and to a large extent the attacks on and misrepresentations of jail administration by various newspapers had ceased. Tobacco is permitted to under-trial prisoners at their own expense, and Colonel Thompson considers that a judicious issue of tobacco to other prisoners as a reward for good conduct would be of assistance in maintaining discipline.

Urgent needs of the department, however, are an habitual jail, a Borstal institution for the segregation of youthful offenders from habitual prisoners, more prisoners' aid societies, and better lighting in the jails.

The average daily strength was 15,220, of whom only 195 were females, 57 per cent. of admissions during the year were Mahomedans, and 38 per cent. Hindus. The decrease in the number of juveniles admitted during the year was satisfactory; only 310 persons below 16 years of age having been committed to prison during the year; this old-standing scandal therefore now at last appears to be dying out. Some 10.7 per cent. of those admitted were able to read and write.

The Juvenile Jail at Alipore continued to function rather as a disciplinary school than as a jail. The daily average number of juveniles in the jail was 195, but had dropped to 179 at the end of the year. In this connection Colonel Thompson again dwells upon the harmful results of short term imprisonment on young boys of 15 years of age and less; such sentences defeat the reformatory objects of the jail, since the boys are not imprisoned for a sufficiently long period to become well trained, whilst often they are of such a tender age that they should never have been sent to jail at all. In this institution no corporal punishment was given,—a marked contrast to such a "free" institution as an English public school. Physical training, Swedish drill and games play a large part in the scheme, whilst religious instruction is provided for the different castes present by their own moulvies or priests. There is some difficulty, however, in the after-care of released juvenile prisoners.

About one-third of the prisoners admitted during the year had received sentences not exceeding one month. These sentences are perfectly useless and harmful from every point of view. They are too short to act as a deterrent to crime and are never reformatory; on the other hand, they are sufficiently long to lead to the mingling of such short term prisoners with habituals of the most undesirable class, who encourage them to a career of crime. In fact, such sentences do more to stimulate rather than to lessen crime; but magistrates have still to realise the lesson. Re-convicted prisoners numbered 23 per cent., which about represents the proportion of habituals among the general jail population; habituals, identified as such, numbered 20 per cent.

Under-trial prisoners during the year numbered 36,375, of whom 10,369 were convicted. The periods of detention of such persons varied from an average of 41 days in sessions cases to 18 days in all other cases.

Turning to the warder guard, conditions show some improvement, and it is high time that they should. The number of resignations shewed a considerable decrease on previous years, and the pay is now the same as for police constables of corresponding rank and length of service. Dissatisfaction continues, however, with

reference to such matters as the supply of uniforms and undress kit, railway and concession passes when on leave, etc., and a memorial has been submitted to government.

During the year there were 13 escapes, 10 of them from outside the jails, and 6 of these from jail gardens. The rules regarding the employment of convicts as prison officers,—convict warders,—were revised during the year and the system is reported to have worked very satisfactorily; until funds permit it is impossible to do away with this system, but, on the whole, it is a satisfactory one.

Financially, the total expenditure in the department during the year was Rs. 24,04,832, which represents a saving of over 4 lakhs on the figure for the previous year. A net cash earning of Rs. 4,35,715 was contributed to government revenues, chiefly by the Dacca Central, Alipore Central and Midnapore Central Jails. The Presidency Jail deals largely in jute products, furniture and ironmongery; the Alipore Central Jail prints and supplies official forms; the Midnapore Central Jail is chiefly engaged in tailoring, and a dyeing industry was started in this jail during the year. Dacca Central Jail also manufactures blankets and uniforms, whilst the Alipore Juvenile Jail dealt with 13,044 lbs of quinine sulphate, and cinchona febrifuge.

Turning to the sickness and mortality tables, it is interesting to note how the figures given correspond to those for the province in general. Malaria was the chief cause of sickness,—3,532 admissions with 20 deaths,—but tuberculosis was the chief cause of deaths 154 admissions with 37 deaths. Dysentery, with 1,082 admissions and 27 deaths, ranks third in importance; and diarrhoea, 1,081 admissions with 4 deaths, next. The only other important cause of sickness was abscesses and boils, etc., 959 admissions with 1 death; whilst cholera was virtually absent,—5 admissions with 2 deaths. This last figure, among a daily average population of 15,220 is striking testimony to the efficiency of jail sanitation in the province. The relative infrequency of pneumonia, 122 admissions with 22 deaths, also bears testimony to the care with which prisoners are looked after and nursed when ill.

Government gazetted holidays observed, in addition to Sundays, numbered 9 as against 3 the previous year; whilst on the big festival days extra food is allowed to all prisoners.

Colonel Thompson is to be congratulated on a year of steady progress and improvement of conditions. In brief, we believe that any impartial enquirer would find that jail conditions in India compare not unfavourably with those in England, and are probably better than those in many European States.

ADMINISTRATION REPORT ON THE JAILS OF BIHAR AND ORISSA, 1923. BY LIEUTENANT-COLONEL W. GILLITT, C.I.E., M.D., I.M.S. PATNA: GOVERNMENT PRINTING, BIHAR AND ORISSA, 1924. PRICE, RS. 2.

Two of the chief events of the year were the conversion of the adult portion of the jail at Monghyr into a subsidiary jail, and the opening of a new subsidiary jail at Jamsheerpur; thus changing the number of central and district jails to 17, and of subsidiary jails to 48. The daily average population under confinement was 5,956, and this figure included 191 prisoners from the North-West Frontier Province, taken over by the Government of Bihar and Orissa, owing to over-crowding in the jails of the former province. Of the daily average of 5,956 prisoners, females numbered 118 only.

Youthful offenders under 20 years of age numbered 485, including 47 boys and 1 girl under 15 years of age. The daily average population at the juvenile jail numbered 122, and arrangements have been made in conjunction with the Education Department to hold regular

inspections to test the value of the training given. Technical classes are held in weaving, carpentry and smithy,—the first being the most suitable industry for a boy who has afterwards to make his way in the world. Drill, gymnastics and wrestling and other games are taught for one hour daily, whilst the formation of a Juvenile Prisoners' Aid Society at Monghyr is an event which should help in finding employment for discharged prisoners.

Of 11,495 prisoners admitted during the year, 27 per cent. had received sentences not exceeding one month, and 29 per cent. sentences exceeding one month but not exceeding three months; these figures are very bad, as they indicate the possibility of some 50 per cent. of first offenders mingling with habitual and hardened criminals for just long enough to imbibe their ideas and ways. The Local Government have drawn the attention of magistrates to the harm done to juvenile prisoners by sentences of 15 days or less,—of whom 38 were admitted during the year.

Colonel Gillitt complains of the revision under which simple imprisonment can be awarded under section 109 of the Criminal Procedure Code, and fears that it will mean an increase in the number of prisoners admitted to simple imprisonment in default of finding monetary security. "Simple imprisonment has little to commend it at any time; to give it to habitual criminals of the worst type is distinctly dangerous; they indulge in behaviour subversive of jail discipline and also lay their plans for future crimes after release." Habitual prisoners numbered 11.7 per cent. of those admitted during the year. The Central Jail at Buxar has been set aside for the confinement of this class of prisoners, but has been found to be inadequate; so a part of the Bhagalpur Central Jail has been utilised for the purpose.

Under-trial prisoners averaged a daily strength of 921. Of the total number only 30 per cent. were convicted, the average period of detention being 39 days in sessions cases and 22 days in other cases. Civil prisoners admitted during the year numbered 146, and political prisoners only 9, whilst 49 non-criminal lunatics were sent to jail for observation,—in accordance with the old-standing, but none the less dreadful, custom in India. The Indian Jails' Committee long ago reported on the evils of this custom of sending non-criminal suspected lunatics to jails for observation, and on the agonies which such patients undergo when they realise their surroundings; but until mental detention wards can be provided in the chief hospitals in India, we suppose that this barbarous custom will continue to prevail.

Escapes from jail numbered 15, 10 of them among under-trial prisoners. This included 3 under-trial prisoners who escaped from Bhadrak Subsidiary Jail with the help and connivance of their warder guard. Ten of the 15 were re-captured. With regard to classes of prisoners, it is noted that no less than 36 per cent. were returned as habituals. Whippings are but rarely resorted to in jail discipline,—26 instances; and fetters in only 88 instances. An average of 210 male and 4 female convicts were employed as prison officers out of a total average population of 4,903 male and 118 female prisoners. The strength of the warder guard was increased from 1,185 to 1,190.

Financially, the total cost of the department during the year was Rs. 11,53,374, or Rs. 25,920 less than in the previous year. On an average 4,894 prisoners were employed daily, and the total cash earnings during the year amounted to Rs. 1,72,703. In Buxar Jail tents are manufactured, and there are large tailoring and weaving departments; at Bhagalpur blankets are made, and proposals have been made for the re-organisation of this factory; at Gaya the official forms press absorbs most of the labour available; whilst at Hazaribagh, the manufacture of aloe goods, oil-pressing, cotton weaving and tailoring are the chief industries.

Turning to vital statistics, the ratio of admission to hospital was 39 per mille, and the total deaths 116 out of a total population of average daily strength 5,956 as against a corresponding figure of 100 in 1922. The death rate per mille was 19.4, mainly due to the unhealthiness of Gaya Central Jail, where one-third of the total deaths took place, with a ratio of 50.4 per mille. The chief causes of death were dysentery, pulmonary tuberculosis and pneumonia, but several of these occurred—as usual—among prisoners who were in a bad state of health when admitted. Dysentery was unduly prevalent in Bhagalpur Central Jail, and the Director of Public Health has been asked to undertake an investigation into the prevalence of this disease in the chief jails of the province. Examinations of prisoners' stools for hookworm ova were continued during the year, and 54 per cent. of prisoners found to be infected; apparently ankylostomiasis is an important factor in the incidence of intestinal diseases in the jail population in the province. Leper prisoners are all removed to Muzaffarpur Jail, where there is separate provision for them. It is of interest to note that of the 12,942 prisoners discharged from central and district jails during the year, no less than 57 per cent. had gained in weight since admission.

ANNUAL REPORT OF THE CHEMICAL EXAMINER'S DEPARTMENT, BENGAL, 1923. CALCUTTA: BENGAL SECRETARIAT BOOK DEPOT, 1924. PRICE, 12 ANNAS.

MAJOR T. C. BOYD, F.R.C.S.I., D.P.H., I.M.S., was in charge throughout the year, and 5,557 articles were examined as against 4,293 in 1922. An interesting feature of the year's work was the abolition of the telephone connection, granted in 1906 and of great advantage to the department, but abolished in 1923 on the mistaken grounds of economy; the next time that an important and urgent report on a suspected case of poisoning is urgently required by the courts or other authorities, we suppose that it will be obtained through the usual leisurely "channels of approach."

In the general department, 1,577 examinations were made as against 1,331 in 1922. Of various interesting analyses carried out, several samples of opium were assayed, 1,080 samples of cocaine were examined—a marked increase on the figure of 826 samples for 1922,—and carbon tetrachloride and quinine sulphate samples were examined as to purity. Opinions were asked for as to such divergent facts as the best type of container for quinine tablets, the toxicity of antimony tartrate solutions on keeping, the purity of glucose samples for intravenous injections, the composition of certain cartridges said to produce insensibility, the purity and suitability of samples of chloroform for anaesthesia, and the suitability of samples of methyl alcohol for preparation of Romanowsky stains. A study has also been made of the possibilities of local preparation of liquid extract of ergot and of Indian insulin.

In the medico-legal department, 1,811 cases were examined into as against 1,486 in 1922; the total of work carried out in this department being almost double that for 1921. Stain cases and cases of human poisoning have largely increased of recent years. In cases of human poisoning opium comes easily first as a poison, detected in 12.5 per cent. of visceral specimens examined. It is of interest to note that poisons were detected in 44 per cent. of specimens coming from Native States as against a figure of 19 to 36 per cent. for different divisions in British India. Aconite, arsenic and atropine were the three most common poisons detected in vomited or excreted matter. In only 62 specimens of viscera sent for analysis as to the possible presence of poisons did the medical officers concerned give it as their definite opinion that death was due to poisoning. In 501 such cases the medical officers concerned withheld their opinion as to the true cause of death; a

sufficient indication of the importance and responsible character of the work carried out by the department.

Turning to animal poisoning, the viscera of 100 horned cattle were received during the year, and poison detected in 48 per cent. of them. Aconite, arsenic and aloes are the favourite poisons employed, occasionally atropine and mercury. Blood-stain specimens numbered 1,422 in connection with 451 cases. Blood was detected in 741 of the articles, and that of human origin in 583 of them; 426 suspected seminal stains were examined.

Of several interesting cases recorded, one is an instance of two persons poisoned by oral administration of illicit cocaine; an Anglo-Indian adult female patient took a teaspoonful of strychnine at 5 a.m. after a quarrel with her husband, but lived for an hour and a half afterwards; a suicidal case showed previous administration of oleander prior to suicide by hanging; oleander was detected in the burnt viscera of two female bodies which had been burnt; a fatal case of oleander poisoning from the medicine of a Kaviraj is recorded; also of fatal aconite poisoning in two cases from administration of aconite in pills prescribed by an itinerant quack; whilst a well known recent medico-legal case where liquid extract of nux vomica was dispensed by mistake in place of liquid extract of ergot, notes of which are here recorded, will be within the recollection of many in India.

Correspondence.

B. COLI INFECTION IN THE PUERPERIM.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—I write with regard to the frequency of *B. coli* infections in the puerperim in India; I have recently had two such cases. The first was a European lady, a primipara; she had a straight-forward labour,—vertex I position, with no vaginal examinations made, no douching or other interference. The puerperim was quite normal for ten days with no rise of temperature, even to 99° F. She got up on the tenth day and had retention of urine that night, for which the nurse passed a catheter. Six days later she was dead of acute sepsis. The catheter specimen of urine showed renal epithelial cells, a few pus cells, abundant *B. coli*, and albumin. The lochia were sterile. Indeed I only found out by accident that the nurse in question had, immediately before attending the patient, been attending a similar acute renal-infection puerperal case with severe fever lasting for six weeks and ending in recovery, and had used the same catheter on both patients.

The second case I saw recently in consultation. She was a Goanese multipara who had had symptoms of bacilluria before childbirth. She had fever for a few hours after the child's birth and died with a temperature of 106° F. on the 21st day. The urine resembled that of the first case. The lochia were not examined bacteriologically, but appeared to be normal.

In my experience as Assistant Master at the Rotunda Hospital in Dublin, I never came across such a case, nor have I read of one, nor can I find any description of such cases in the ordinary text-books. Are these cases common in India? Bacilluria itself is very common in Karachi and I have attended several puerperal women who suffered from the pyelitis of pregnancy. But I feel at a loss with regard to this disease. The usual treatment for bacilluria and sepsis in the first of my cases proved useless; in the second it produced a temporary improvement only.

I hope that some of your readers of larger experience than my own will be able to say whether this form of puerperal sepsis is or is not common in India, and

what measures should be taken to prevent or to treat it.—Yours, etc.,

G. T. WRENCH, M.D., B.S. (Lond.).

VICTORIA ROAD, KARACHI,
26th March, 1925.

INTRAVENOUS PITUITRIN.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—I have read with interest the notes of a case of alarming symptoms following an injection of pituitrin in the puerperim by Dr. S. Serhachar, which he ascribes to probable pulmonary embolism, in your issue for March 1925. I have had two exactly similar cases, but with the addition of colicky pains in the abdomen and pelvis. These symptoms are apt to be overlooked in the presence of puerperal or other over-shadowing symptoms, but the patient recalls them in her calmer moments.

In my first case the injection was given intravenously, and the train of symptoms so well described by Dr. Serhachar immediately followed, but subsided within a few minutes. Being in doubt as to the cause of the sudden appearance and disappearance of such acute circulatory and abdominal symptoms, I took an early opportunity of testing pituitrin intravenously in a second case, a normal female patient with intestinal stasis. The result was the same.

Pituitrin is not for intravenous use. It is a potent drug, and the further it is kept from a vein the better. Possibly Dr. Serhachar may have accidentally injected it into a vein, with the result of the dramatic symptoms described. Amyl nitrite capsules, in my experience, may be relied upon in such cases to cut short the distressing and acute symptoms following upon such an injection.—Yours, etc.,

D. M. VASAVADA,
Assistant Surgeon.

BIKANER,
20th March, 1925.

A LARGE CALCULUS.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—A large stone, weighing $5\frac{1}{2}$ ounces, was recently removed by Major C. H. Reinhold, M.S., F.R.C.S., I.M.S. from an adult male patient in this district, with a history of symptoms of nine years' duration. The stone was hard and required five evacuations and took one and a half hours for removal. This is the largest stone removed by litholapaxy at this hospital. Will you or one of your readers kindly let me know what is the largest stone to have been removed by this method?—Yours, etc.,

S. SINGH, P.M.S.

LUDOVIC PORTER HOSPITAL,
MERRUT, U. P.
15th February, 1925.

VACCINATION IN RURAL AREAS.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—The immortal story of the introduction of vaccination by Jenner is well known. "It is on record," writes Dr. C. Banks in a pamphlet on the subject, "that an English farmer named Benjamin Jesty intentionally inoculated his wife and two sons from a cow suffering from the disease as a protection from small-pox,"—probably the first instance in which such protection was resorted to. Yet the Indian farmer and rural cultivator has not appreciated the benefits of vaccination, and the annual victims of small-pox can be counted by thousands among men, women and children in this country.

Is there no way in which to break this wall of prejudice and opposition? These people are illiterate; scientific lectures do not interest them, and ordinary propaganda leaves them untouched. But if entertainment can only be combined with such teaching, much might be accomplished. I would suggest coloured lantern slides as an aid to popularising vaccination. If vaccinators were but trained in methods of popular lecturing and given the necessary outfit for popular lectures with coloured slides, vaccination might be popularised.

Some years ago, when serving in the vaccination department in Bengal, I saw many vaccinators carry out the operation in an entirely unprofessional and often septic manner. The results of such vaccinations are to render the method of protection unpopular. The vaccination staff should be trained, not only in the aseptic technique of the operation, but in methods of teaching and popularising vaccination. Only in some such way can improvement come about.—Yours, etc.,

S. P. NAG, L.M.S.

GOZINA, DASPUR, HOOGHLY,
22nd March, 1925.

TUBERCULOSIS SANATORIUM REPORTS.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—I remember to have read somewhere that in Germany the annual reports of all Sanatoria for tuberculosis are collected and edited in one booklet for the benefit of general practitioners. The scourge of tuberculosis is increasing in India, though there are but few Sanatoria for the treatment of tuberculosis in India. If the physicians in charge of these would only issue detailed annual reports with special reference to the treatment and results, I think it would not be difficult to collect all the information on advances in treatment for the enlightenment of the medical profession. If your staff would undertake such work in this country, it would materially help the mutual exchange of knowledge. I for one, as interested in the subject, am prepared to give my quota of help however humble. I am confident that the physicians in charge of different Sanatoria will gladly co-operate in such a work and give us the full benefit of their experiences.—Yours, etc.,

D. M. VASAVADA,
Assistant Surgeon.

BIKANER,
15th March, 1925.

[Note.—We would very gladly review such annual reports of tuberculosis Sanatoria in India, if received. At present the only one received regularly is that of the Union Mission Tuberculosis Sanatorium at Arogyavaram, S. India. The subject is of extreme importance in tropical medicine; but, unless we receive such reports regularly, we regret our inability to review them.

In this connection, we would like to point out that we have lately ceased to receive the annual reports of several Directors of Public Health, Surgeons-General and Inspectors-General of Civil Hospitals in different Provinces in India. The idea underlying such curtailment is—apparently—economy in stationery and postage. We profoundly deplore such a decision. The *Indian Medical Gazette* has at present a monthly circulation of over 3,000 copies in India, in addition to some 350 copies per month overseas. If such Provincial Governments neglect this source of publicity, they have only themselves to blame. The congestion in our available space has now been relieved, and reviews of the general public health activities in India are of first importance both to ourselves and to our readers. We would appeal to the many different officials concerned to help us in this matter.—EDITOR, I. M. G.]

CORIANDER SEEDS.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—In Birdwood's "Practical Bazar Medicines," on p. 47 of the 1920 edition, one reads that coriander (*dhania*) seeds are aromatic, carminative, and anti-spasmodic.

Having devoured with avidity the contents of this useful book, I have for the last four years been extensively using these cheap and equally effective Indian remedies with happy results. They make a special appeal to Indians, not merely because they are cheap, but also because they are essentially Indian.

I would like to know if any of your readers or contributors have found coriander markedly emmenagogue and diaphoretic in action. It has been my experience in three cases to observe a decidedly emmenagogue effect, not one of coincidence in any of the three cases. At the outset of a "cold" there is nothing so gratifying in its results as what I term coriander tea. I use one ounce of the crushed seeds, boiled in a breakfast cup of water to half the volume, add hot milk and sugar to taste and drink it hot before retiring at bed time.—Yours, etc.,

B. J. BOUCHE, I.M.D.,
Assistant Surgeon.

JUDOGH, SIMLA HILLS,
18th March, 1925.

A METHOD OF REDUCING DISLOCATIONS OF THE SHOULDER JOINT.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—I describe below a method of reducing dislocation of the shoulder which I have been practising for the last 15 years. I have thus treated about 50 cases without a failure, and I think it can now be said to be a sound and very useful method. It is as follows:—

- (1) Make the patient stand in front of you, when you are also standing facing him.
 - (2) Raise the injured arm gently and place the forearm on your own shoulder in front; thus if the right shoulder is injured, you put the right forearm of the patient on your left shoulder and *vice versa*.
 - (3) Tell the patient to pass his sound hand below your other armpit and grasp the wrist of his injured arm firmly behind you. He thus encircles you in his arms.
 - (4) Put your thumb in his injured armpit, over the displaced head of the bone, and pass the fingers below and behind the shoulder so as to grasp it.
 - (5) Tell the patient to sit down. If for any reason he does not do so, press him down with your other hand.
 - (6) When he does so, the weight of his body acts as an extending force and the bone is found to leave its new place and then can be easily guided with your thumb to its proper place. It will go quietly and obediently very often of its own accord to its proper place.
 - (7) After reduction put the hand on the opposite shoulder and bandage as usual.
- From the above, it will be seen that the method:—
1. Is surpassingly simple, safe and satisfactory.
 2. No chloroform or any special appliance is required.
 3. Co-operation of the patient is secured from the beginning; therefore there is no struggling on either side.
 4. No injurious pressure is exercised over the axillary vessels and nerves as in some other methods.
 5. It can be practised on the spots. I reduced one on the sands of Back Bay, Bombay, while out for a walk in the evening.
- In fact it takes more time to describe the method than to actually demonstrate it.

It is fair to acknowledge what I owe to the gymnast and bone-setter of Kolhapur, whom I observed reducing a dislocation of one of his wrestling disciples, of course in his own way. I only improved upon it, and had to do so, not being so strong. He lifted the patient up from the ground by catching the elbow of the dislocated arm and guided the bone with his other hand. If the weight of the patient was not sufficient to dislodge the bone from its abnormal site, he asked some one to pull the patient's legs down. However crude it may look, the method always succeeded as stated by him. It also succeeds in my way.

I have taught and practically demonstrated this method to several young medical practitioners, who were then medical students at the B. J. Medical School, Poona, when I was there as a tutor and at the Medical School and Civil Hospital, Hyderabad, Sind, where I was the surgical registrar. I would be very glad to learn from them their experience of this method through your esteemed columns.—Yours, etc.,

S. C. SHRIKHANDE, M.C.P. & S.

SAUNDATTI DISPENSARY,
BELGAUM DISTRICT.

[Note.—Our correspondent does not state which variety of dislocation at the shoulder-joint he treats by this method. Presumably the sub-glenoid variety, one which is usually readily amenable to treatment.—EDITOR, I. M. G.]

Service Notes.

APPOINTMENTS AND TRANSFERS.

Lieutenant-Colonel R. W. Anthony, M.B., F.R.C.S.E., I.M.S., is appointed to officiate as Inspector-General of Civil Hospitals, Central Provinces, with effect from the 30th March 1925, *vice* the late Colonel J. A. Black, I.M.S., until further orders.

Lieutenant-Colonel J. R. J. Tyrell, I.M.S., Agency Surgeon in Bundelkhand, is appointed to officiate as Political Agent in Bundelkhand, in addition to his own duties, with effect from the 23rd March 1925, and until further orders.

The services of Lieutenant-Colonel J. W. D. Megaw, M.B., I.M.S., are placed permanently at the disposal of the Government of Bengal, with effect from the 15th November 1921.

The Viceroy and Governor-General has been pleased to make the following appointment on His Excellency's personal staff, with effect from the 18th March 1925.

To be Honorary Surgeon.

Lieutenant-Colonel G. Tate, M.B., I.M.S., *vice* Lieutenant-Colonel D. W. Sutherland, C.I.E., M.D., I.M.S., tenure expired.

The services of Major J. B. Hanafin, C.I.E., F.R.C.S.I., I.M.S., are placed temporarily at the disposal of the Government of Assam, with effect from the date on which he assumes charge of his civil duties.

The services of Captain P. D. Chopra, I.M.S., are placed temporarily at the disposal of the Government of the Punjab for employment in the Jail Department, with effect from the date on which he assumes charge of his duties in that Department.

The services of Captain G. H. Mahony, M.B., I.M.S., are placed temporarily at the disposal of the Government of Central Provinces, with effect from the date on which he assumes charge of his civil duties.

Captain K. R. K. Iyengar, D.P.H., M.B., I.M.S., an Officer of the Medical Research Department, is on reversion from military duty appointed to officiate as Assistant Director of the Central Research Institute, Kasauli, with effect from the 9th March 1925.

LEAVE.

Lieutenant-Colonel S. Hunt, I.M.S., an Agency Surgeon, is granted leave on average pay for 6 months and 22 days combined with leave on half average pay for 1 year 6 months and 14 days under the Fundamental Rules, with effect from the 24th February 1925.

Lieutenant-Colonel F. P. Mackie, O.B.E., M.D., F.R.C.P., F.R.C.S., I.M.S., Director, Bombay Bacteriological Laboratory, is granted leave on average pay for 6 months, with effect from the 10th April 1925, or the subsequent date on which he may avail himself of it.

Lieutenant-Colonel W. F. Harvey, C.I.E., I.M.S., Director, Central Research Institute, Kasauli, is granted preparatory to retirement, leave on average pay for 8 months combined with leave on half average pay for 20 months, with effect from the 25th May 1925, or the subsequent date on which he may avail himself of it.

In modification of the orders already issued, Major W. D. H. Stevenson, C.I.E., I.M.S., Director, Pasteur Institute, Kasauli, is granted leave on average pay for 8 months combined with leave on half average pay for 4 months, with effect from the 3rd October 1924.

ADMISSION TO THE INDIAN MEDICAL SERVICE.

To be Captains.

W. Aitchison and R. W. H. Miller. Dated 1st January 1925.

Gilbert Johnston Smith. Dated 3rd March 1925.

To be Lieutenants.

Cuthbert Alfred Bozman, Alfred Bosenbloom, Martin Patrick Conroy, Walter Scott and Stanley Charles Harwood Worseldine. Dated 3rd March 1925.

PROMOTIONS.

Lieutenant-Colonels to be Colonels.

H. Boulton, C.B.E., I.M.S., vice Colonel F. Wall, C.M.G., K.H.S., I.M.S., retired, with effect from the 5th March 1925.

Colonel Boulton's tenure of appointment will reckon from the 10th March 1925.

Captains to be Majors.

J. C. De, M.B., I.M.S. Dated 26th January 1925.

S. S. Sokhey, M.B., A. Seddon, M.B. and R. V. Martin. Dated 26th January 1925.

Lieutenant to be Captain.

W. H. Critien, I.M.S. Dated 8th December 1924.

RETIREMENTS.

Lieutenant-Colonel O. St. John Moscs, M.D., F.R.C.S.E., I.M.S. Dated 20th March 1925.

Lieutenant-Colonel R. A. Lloyd, D.S.O., M.D., I.M.S. Dated 13th January 1925.

Lieutenant-Colonel Sir D. G. R. S. Baker, Bt., I.M.S. Dated 14th February 1925.

Major J. H. Horne, I.M.S. Dated 11th February 1925.

MISCELLANEOUS.

The names of the undermentioned have been brought to notice for distinguished service during the Operations in Waziristan, 21st April 1923 to 31st March 1924, by His Excellency General Lord Rawlinson of Trent, G.C.B., G.C.S.I., G.C.V.O., K.C.M.G., Commander-in-Chief in India, in the Despatch dated the 11th June 1924 (Published in the Supplement to the *London Gazette*, dated the 18th November 1924).

Captain T. R. Birmani, I.M.S.

" C. M. Ganapathy, M.C., I.M.S.

" D. V. O'Malley, O.B.E., M.B., I.M.S.

" M. V. Pathak, I.M.S.

" P. Prasad, M.B., I.M.S.

" R. V. Rau, I.M.S.

The King has been graciously pleased to give orders for the following appointments to the Most Excellent Order of the British Empire, for valuable services

rendered in the field in connection with Military Operations in Waziristan, 21st April 1923 to 31st March 1924:—

To be Members of the Military Division of the said Most Excellent Order:—

Captain A. N. Bose, I.M.S.

" H. H. Elliot, M.C., I.M.S.

NOTES.

BOVRIL, LIMITED.

PRESIDING at the twenty-eighth annual general meeting of Bovril, Limited, held in London on 4th March, Sir George Lawson Johnston (chairman) congratulated the shareholders on having had a successful year. He said:—

"The gross profit on trading, less advertisements, stands at £639,123, as against £571,491 for the year 1923. This gross profit, constitutes a record."

Referring to recent advertising schemes, Sir George Lawson Johnston emphasised how the display of some of the series of Bovril posters brought back advertising memories of the last quarter of a century, and many were surprised to see how long a slight tinge of humour had been a feature of these posters, which otherwise depict a serious food fact.

It is rather surprising that it is only in recent years that a touch of humour in posters has become prevalent.

Sir James Crichton-Browne said the Company was constantly receiving testimony to the value of Bovril from all quarters of the globe and under the most diverse conditions. Bovril had been used largely by the enterprising Oxford University Arctic Expedition, by which, for the first time in history, an aeroplane had been employed in Arctic exploration; it had been carried by Mr. Simpson, of the *Daily Telegraph* Expedition, which twice crossed the continent of Australia in a Bean motor-car; and supplies of Bovril had been laid down at ten selected depot points for the use of the great Cape to Cairo motor expedition, now in progress under the leadership of Captain Court Treath. These were emergency uses of Bovril. The extent of its routine and habitual consumption was best shown by the figures which had been submitted to the shareholders. Bovril was of firmly established reputation and world-wide acceptance, and he ventured to predict for it a still growing popularity. It represented in an agreeable and easily assimilable form that animal protein upon which all the great nations of the world had been built up, and the amount of which, as a food constituent—might be taken as a measure of the physical efficiency and power of resistance to disease of the different races of India.

OPHTHALMOLOGICAL CONVENTION,
LONDON, 1925.

THE Ophthalmological Society of the United Kingdom, together with its affiliated Societies, has decided to hold in London from July 14th to 17th, 1925, a Convention of English-speaking Ophthalmological Societies and Associations, all members of which are invited to attend. On Monday evening, July 13th, a reception will be held at the Royal College of Surgeons of England. Four mornings, two afternoons and one evening will be devoted to the scientific work of the Convention. The Bowman lecture will be given by Sir John Parsons, C.B.E., F.R.S., on the afternoon of July the 16th. On the evening of July 15th there will be a discussion on "The Evolution of Binocular Vision," in which Sir Charles Sherrington, Sir Arthur Keith, Sir Frederick Mott, Prof. Elliot Smith and Prof. S. E. Whitnall will take part. "Microscopy of the Living

Eye" will be discussed by Dr. Gordon Byers, Dr. A. J. Bedell, Mr. Harrison Butler, and Mr. Basil Graves. A garden party will be given by Sir William and Lady Lister; there will be a reception at the Wellcome Medical Museum; and excursions to Oxford and to Cambridge. The registration fee for those who are not members of the Ophthalmological Society, of the United Kingdom will be £2. Mr. Leslie Paton, 29, Harley Street, London, W. 1, is Secretary to the Convention, and those intending to attend the Convention should communicate with him.

LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE.

DIVISION OF TROPICAL MEDICINE AND HYGIENE.

The following Medical Officers passed the School Examination at the termination of the 77th Session (January-March, 1925):—

Passed with Distinction.

Craighead, A. C., Winner of "Duncan" Medal.
Haworth, A. N.
Klaber, R.
Goldsworthy, N. E.
Mohammed, A. S.

Passed.

Lumsden, K.
Vickers, W. J.
Garnham, P. C. C.
Campbell, A. H.
Cook, E. N.
Banks, J. N.
Graham, J. W.
Monks, A. B.
Fraser, E. M.
Struthers, E. B.
Grant, P. F. A.
Brown, H. H.
Bowyer, J. H.
Ali, M.
Gordon, J.
Manley, J.

Passed.

Speirs, R. C.
Goodwin, T. S.
Read, F. C.
Lal, M.
More, H. J.
Enzer, J.
Wilde, O. G.
Thambiah, R. W. C.
Coomarasamy, A. N.
Moffatt, C. M.
Maelean, A. H.
Stuart, J. L.
Mumford, R. H.
Pan, T. C.
Chan, V. F. T.

EXAMINATION RESULTS. FACULTY OF TROPICAL MEDICINE, BENGAL. SESSION 1924-1925.

At the examination in April 1925 for the Diploma in Tropical Medicine (Bengal), held at the Calcutta School of Tropical Medicine, 29 candidates appeared. Of these, the following 21 passed:—

Passed with Distinction.

1. Dr. T. K. Raman, M.B., B.S.

Passed (not in order of merit).

1. Dr. Abdul Majed, M.B.
2. " Banta Singh, M.B., B.S.
3. " N. H. Bharueha, L.M. & S.
4. " C. J. D. Burghall, I.M.D.
5. " Ram Kinkar Chakravorty, M.B., D.P.H.
6. " Probhat Chandra Das, M.B.
7. " Nripes Chandra Das Gupta, M.B.
8. " Kshirode Lal De, M.B.
9. " R. S. Donaldson, M.B., Ch.B. (Glasgow).
10. " Jotindranath Dutt, M.B.
11. Miss A. G. Gault, M.B., B.S.
12. Dr. Nagendra Nath Ghosh, L.M.P.
13. " Umapati Gupta, M.B.
14. " R. V. Kalyanpurkar, M.B., B.S.
15. " Rajani Mohan Kar.
16. Capt. W. E. Mascarenhas, M.B., B.S.
17. Dr. C. McGuire, I.M.D.
18. " S. Nagaswami, M.B., B.S.
19. Lt. H. Vasant Rao.
20. Capt. Bijayananda Sen Gupta, M.B.

"ETHIDOL" ETHYL IODO-RICINOLEATE.

"Ethidol" is a preparation evolved in the laboratories of Messrs. Burroughs Wellcome Co. as an outcome of the successful internal use of "Iodinein," a calcium salt of iodo-ricinoleic acid. In "Ethidol" the calcium base is replaced by the ethyl radical and the result is a product, presenting 20 per cent. of iodine in organic combination, suitable for intra-glandular injection or inunction.

Its therapeutic application is naturally based upon its high iodine content and penetrative power, and, after clinical trials extending over two years, sufficient evidence has accumulated to indicate its usefulness and to justify its general introduction to the medical profession.

As an injection it has been employed in epilepsy, rheumatoid arthritis and in the treatment of tuberculous and scrofulous glands.

As an inunction successful clinical results have followed its use in simple goitre and rheumatoid arthritis and, in view of its iodine content, its further trial is suggested in sprains, neuritis and some skin affections such as eczema, psoriasis, ringworm and erysipelas. "Ethidol" does not stain or cause local irritation.

It may be heated to 100° C. for sterilisation before injection. Injections are stated not to cause induration and are usually painless.

Should reduction in strength be considered desirable, it is miscible with almond oil, olive oil, "Paroleine" or "Borofax."

"Ethidol" is issued in bottles of 1 oz. and 4 oz.

MARGOSIC PREPARATIONS.

We have received from the Calcutta Chemical Co. 35-1, Pandit Road, Ballygunge, Calcutta, a small brochure dealing with their margosic preparations. The antiseptic and stimulating properties of "neem" leaves have been recognised in India for centuries. As shewn by Dr. K. K. Chatterji, F.R.C.S., Dr. C. R. Roy, Mr. R. N. Sen, M.A., M.Sc., and others, the active principle is a fatty acid, margosa oil, which is stated to have bactericidal and anti-protozoal properties, which are further enhanced on combination with different metals. The ethyl esters of the oil have a higher percentage of the fatty acid and are therapeutically more active than the oil itself.

Of the many preparations listed, "Margampules" are suitable for intramuscular—or, with due care, for intravenous-injection; "Margoloids" are suitable for oral use, and "Margolene" for inunction. Dusting powders, soaps, and a dental powder are also prepared. These preparations are advocated in skin diseases in general, for injection and inunction in cases of syphilis, in leprosy, sepsis in general, tubercular ulcers and sinuses; and for urethral irrigations of "Silvmarg"—a silver compound—in gonorrhœa. Those interested in the development of indigenous Indian drugs might do well to turn their attention to these interesting preparations.

'SOLOID' BENEDICT TEST.

BURROUGHS, WELLCOME & Co. have issued a 'Soloid' preparation of the Benedict qualitative test for glucose in urine. The presence of sugar is indicated by change of colour and by the formation of a yellowish red precipitate.

This test is remarkably easy to carry out and is characterised by simple reading. It is reputed to be considerably more delicate than Fehling's test. For example, urine containing 0.1 per cent. of glucose produces a change of colour, whilst this change is very decided when 0.2 per cent. or more of glucose is present.

In many bio-chemical laboratories, particularly in America, the Benedict test has replaced other methods. In view of the large and increasing number of diabetics who are being treated with Insulin and who

are being taught, as part of the routine insulin treatment, to examine their urine daily, this 'Soloid' preparation will be appreciated by medical men. Its keeping qualities and the fact that it obviates the necessity of measuring out stock solutions will readily be appreciated.

Two methods of procedure are given, one of which is most convenient for use in the ordinary household and which gives a clearly defined reading for amounts as low as 0.1 per cent.

'Soloid' brand Benedict Test is not only more delicate than the older methods, but is specially suitable for qualitative analysis outside the laboratory, especially for patients to whom insulin is being administered and whose urine sugar-content must remain the deciding indicator in treatment.

'Soloid' Benedict Test is supplied in cartons containing material for 24 tests.

WATSON'S "MICROSCOPE RECORD."

SOME time ago we commented upon the enterprise of Messrs. W. Watson & Sons, Ltd., 313, High Holborn, London, W. C. 1, in issuing gratis a journal devoted to the interests of microscopy. No. 4 issue—for January, 1925—of "Watson's Microscope Record" is as interesting as its predecessors. In the current microscopy column the question of the sub-stage condenser is discussed; Mr. J. M. Offord, F.R.M.S., discusses the microscope and pond life; Mr. H. Wrighton, B.Met., describes new photo-micrography apparatus; whilst in article entitled "Why not Micro-fungi?" draws attention to the extreme interest and simplicity of methods for the study of this interesting group of organisms. Mr. G. H. Needham describes a new method for the preparation of styrax and balsam of Tolu for use as mounting media of high refractive index;—a method especially suitable for the study of diatoms, but also useful for such objects as helminthic ova and coccidial oocysts. The notes and queries column deals with the photography of lightly stained specimens, opaque mounting, condensers and thick slips, and colour filters. The whole number is one which will appeal both to the general microscopist and to laboratory workers in general.

THE M.H.S. CLIP.

MESSRS. BRIDGE & Co., 92, Chancery Lane, London, W. C., have forwarded to us samples of a very ingenious card index clip, designed by Mr. J. M. F. Whitby, a medical student in his final year, intended for fastening together index cards, medical history sheets, etc. Circular pieces of transparent linen, 0.7 inches in diameter, are sewn together across one diameter so as to make a little book of four semi-circular leaves. Two pairs of adjacent surfaces are covered with adhesive for the purpose of holding the edges of cards placed between them. The hinges are practically untearable. Cards can thus be bound together into a book with these adhesive hinges; and additional cards be added to make the book of any thickness. The cards fold flat against each other when thus fastened, whilst the transparency of the fastener is an additional advantage. The price is 1s. 3d. per 100, or 5s. 9d. per 500 clips, plus postage.

ANTIPHLOGISTINE AND ITS IMITATIONS.

We have received the following note from the Denver Chemical Manufacturing Co., which we publish with pleasure:—

"From time to time unscrupulous manufacturers exploit imitations of Antiphlogistine under misleading and confusing names. These preparations, purporting to resemble as nearly as possible the original Antiphlo-

gistine, are often without hygroscopic or osmotic properties, and are usually inert.

"A package of one of these nicknamed imitations sent to The Denver Chemical Manufacturing Company, when analyzed at their laboratory in New York, was found to be a grimy mixture of clay and crude oil, which burned with the characteristic offensive crude oil flame and stench. The preparation was not only without therapeutic value, but the application of such material in some conditions would work certain harm.

"A large percentage of Antiphlogistine is chemically pure glycerine, which, as we know, has a strong affinity for water. The glycerine exposed to the air will absorb much moisture and this reduces its hygroscopic power. The formula for Antiphlogistine has long been in the hands of the medical profession and thus they know always what they are prescribing. It is more the process of manufacture that counts. The Denver Chemical Manufacturing Company are specialists, having devoted over a third of a century to the manufacture of this one product, and the thought and energy of its entire personnel have been with but one thought in mind—Antiphlogistine.

"Chemicals of this kind which are carelessly handled and not properly compounded lose whatever therapeutic value they may have before they ever come into the hands of the consumer.

"Since Antiphlogistine is a strictly ethical product, it is impossible for the manufacturers to caution patients directly against these spurious preparations. They must depend upon the physician who prescribes for the patient and upon the druggist in whose hands the patient trusts his prescription. More than 200 imitations purporting to be the same as Antiphlogistine have been exploited in different parts of the world during the past few years, but in almost every instance, they have utterly failed to impress the doctor, the reason being that products of this kind fail in at least one important particular—that is, they do not have the hygroscopic, osmotic property upon which the success of Antiphlogistine so greatly depends."

Publishers' Notice.

SCIENTIFIC Articles and Notes of interest to the profession in India are solicited. Contributors of Original Articles will receive 25 reprints of the literary pages of the "Gazette" gratis, if asked for at the time of submitting their manuscripts.

Communications on Editorial Matters, Articles, Letters and Books for Review should be addressed to THE EDITOR, *The Indian Medical Gazette*, c/o Messrs. Thacker, Spink & Co., P. O. Box 54, Calcutta.

Communications for the Publishers relating to Subscriptions, Advertisements, and Reprints should be addressed to THE PUBLISHERS, Messrs. Thacker, Spink & Co., P. O. Box 54, Calcutta.

Annual Subscription to "*The Indian Medical Gazette*," Rs. 16 including postage, in India. Rs. 18 including postage, abroad.

Papers and articles forwarded for publication are understood to be offered to the *Indian Medical Gazette* alone, and any breach of this rule will be followed by non-publication.

The Editors of the *Indian Medical Gazette* cannot advise correspondents with regard to prescriptions, diagnosis, etc., nor can they recommend individual practitioners by name, as any such action would constitute a breach of professional etiquette.

Original Articles.

CHOLERA IN BENGAL: PAST AND PRESENT.

By A. B. FRY, C.I.E., D.S.O., M.D. (Lond.), D.P.H.,
LIEUTENANT-COLONEL, I.M.S.,

*Professor of Hygiene, Calcutta School of Tropical
Medicine and Hygiene.*

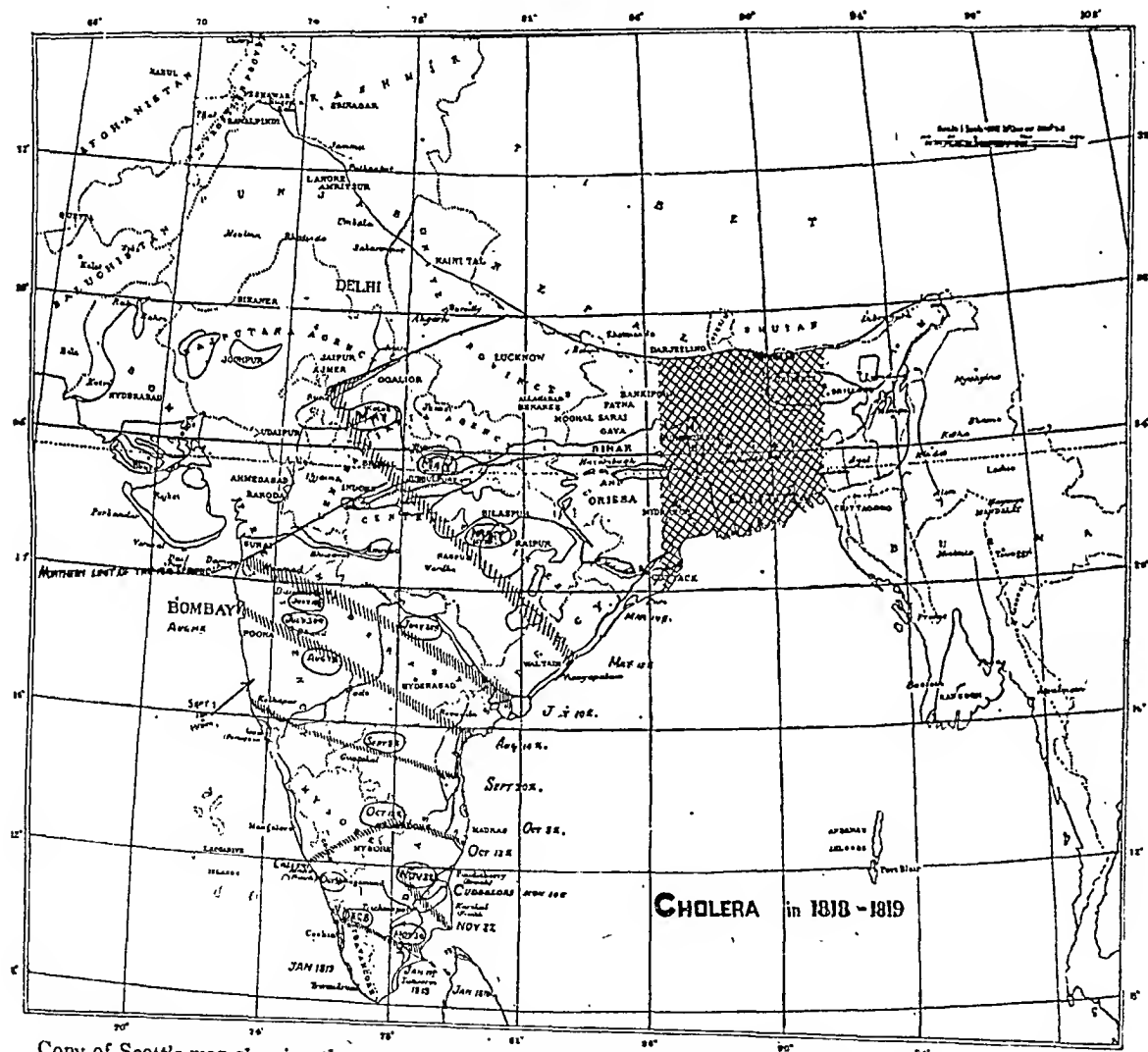
At the October session of the Standing Committee of the Office Internationale d'Hygiene Publique, I was asked the following questions:—

(1) Is Bengal nowadays the endemic home of cholera, as it used to be in the past?

available. (1) Hirsch's Handbook of Geographical and Historical Pathology," 1883, Vol. I; (2) Macpherson's "Annals of Cholera," London: 1872; (3) "Report on Epidemic Cholera Morbus in the Presidency of Bengal in 1817 to 1819" by James Jameson, Calcutta: 1820; (4) "Report on Epidemic Cholera in Madras" by W. Scott, 1824; (5) "Report on Cholera Epidemics from 1817 to 1872" by James L. Bryden, Calcutta: 1874; (6) The Annual Reports of the Sanitary Commissioner with the Government of India; and (7) "A Treatise on Asiatic Cholera" by C. Macnamara.

Hirsch says: "In the year 1817 there began the epidemic extension over India of a disease which

MAP I.



Copy of Scott's map showing the progress of epidemic cholera in 1818 and 1819. The portion cross-shaded is that always shown in old reports of the Sanitary Commissioner with the Government of India as the home of endemic cholera from which all epidemics start.

(2) Does Bengal still spread epidemic cholera throughout India and thence to the rest of the globe?

This article is an attempt to answer this serious indictment.

Past History of the Disease.

Concerning the cholera of the last century there is a considerable amount of literature

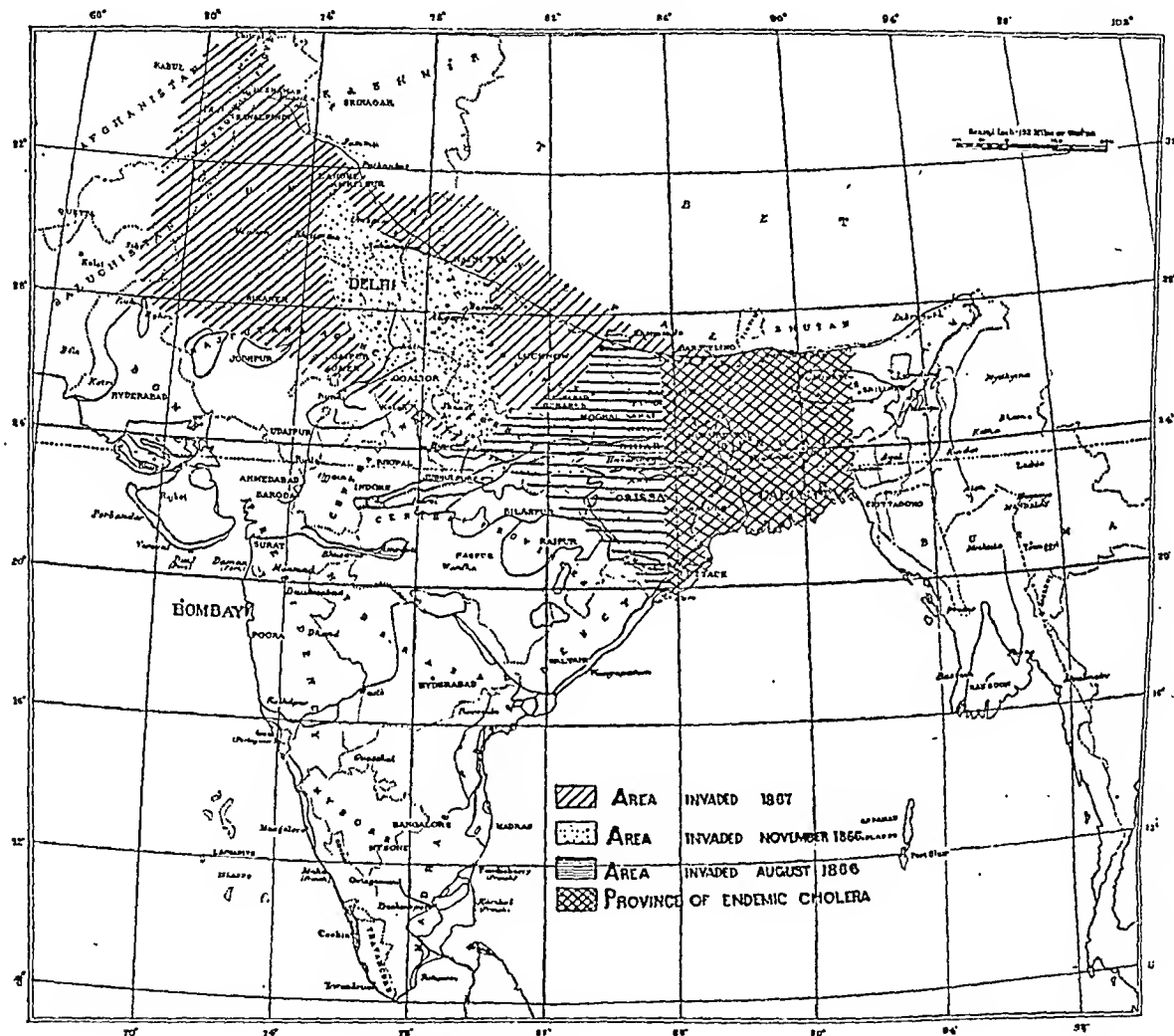
had previously been known as an endemic in a few districts of the country. In that and the following years it overran the peninsula and crossing the borders of its native territory it penetrated to almost every part of the habitable globe." He goes on to give a full history of four great pandemics 1817-1823, 1826-1837, 1846-1849 (which remained so late as 1854 in the islands of the West Indies), and 1865-1875 (a pandemic

which was noticeable for the rapidity with which it spread to Europe and the Western Hemisphere). This last epidemic commenced in the lower Ganges basin in 1863 and leaving India in 1865 was widely spread in North and South America in 1866, reaching Guadeloupe directly by ship from Marseilles, and to Halifax in Nova Scotia by ship from Liverpool.

Scott traces the spread of the 1817 epidemic from Bengal through the peninsula to Ceylon which was reached in January 1819. Map I is a copy of the map which illustrates his report.

its natural territory in lower Bengal, by what Bryden terms 'the epidemic highway,' across the Central Provinces, and southward through the Deccan and Bombay Presidencies towards Madras territory, which in a longer or shorter space of time is occupied. Nor does cholera terminate with the extreme southern limit of the peninsula. In all true epidemic invasions, from 1818 down to 1870, it has been carried on to the neighbouring island of Ceylon. In this southern progress of cholera a period of two years may elapse (as in the latest invasion) before the epidemic has

MAP II.



Cunningham in the annual report of the Sanitary Commissioner with the Government of India quotes Scott's narrative as follows:—

"The history of the epidemic advance of cholera in 1818, as detailed in Scott's narrative, is, in point of fact, the history for all time of the mode in which the Peninsula and Southern India are invaded. In every new invasion there are sure to be some minor differences as to the rapidity of movement of, and the extent of country covered by cholera, but the main facts are unalterable. The broad truth in regard to invasion to be borne in view is that the great body of cholera which invades Southern India leaves

travelled its southern course from Bengal to Ceylon, or, as in 1818, the whole journey may be completed in six or seven months. The epidemic of cholera that left Bengal in the spring of 1818 reached Ceylon in January 1819; but, with all the facilities for rapid communication introduced during the last half century, we find that the great body of moving cholera in the last epidemic invasion which fell upon the Central Provinces in the spring of 1868, did not reach Ceylon until May 1870."

Jameson's history of the 1817-1820 epidemic is quoted by Bryden. "There was universal cholera in the endemic province in the first six

months of the year 1817. In May and June it occurred to an unusual degree in Nuddea and other districts. It did not attract notice until August when the rapidity of its progress and general extension caused great alarm.

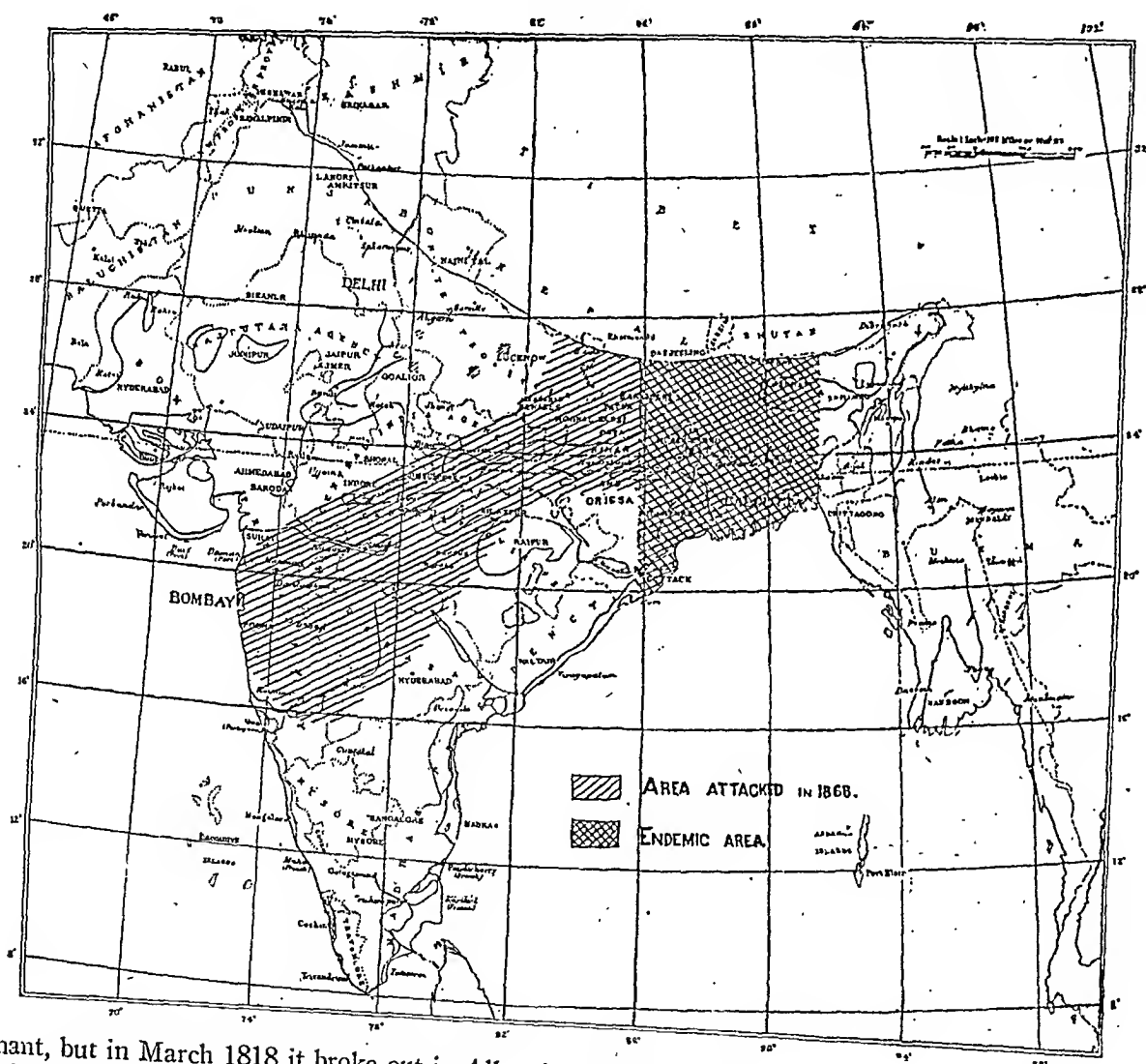
"Facts prove that cholera broke out at remote places at one and the same time. A month before Jessore was attacked the disease was epidemic in Bihar and Dacca. In August it raged in Chittagong. In the autumn of 1817 cholera was epidemic from Sylhet in the east to Cuttack and Puri and extended west nearly to Allahabad.

"In the winter of 1817-1818 cholera remained

outbreaks 1855-1858 and 1859-1862 with this epidemic of 1817-1820 described by Jameson is perfect."

Bryden, Cunningham and other writers regard the 1817-1820 epidemic as the starting point of endemic cholera in Bengal. The disease was known in India before then. In the Nidán of Susruta a disease called *Vishuka* is described which is typical of acute cholera. Hippocrates, Galen and Celsus are witnesses to the existence of cholera. The dark ages are barren of records but Gaspar Correa, a Portuguese physician, in "Lendas da India" (1503) records that 20,000

MAP III.



dormant, but in March 1818 it broke out in Allahabad and reached Lucknow in April and May. In fact, it advanced steadily west on a front of 300 miles. It then took a south-west direction to almost every town and village of Bundelkhand and Saugur, thence this southerly stream headed to Bombay. The northern branch passed from Ondli to Agra and Delhi in August 1818. There was a northerly extension to Nepal. In 1821 the disease reached the Persian Gulf, Syria and Asia Minor and in 1823 appeared on the Caspian and Mediterranean coasts."

Bryden remarks on this:—"The parallel of the

men of the army of the king of Calicut died of "a disease sudden-like which struck with pain in the belly so that a man did not last out eight hours." He reports further that there was an epidemic in Goa in 1543 which was known as *moryxy* and by the Arabs as *hachaiza* (haiza). It must be remembered that at this time no Europeans knew anything of the Indian continent, and the disease may well have had a widespread existence. In 1774, Dr. Paisley, writing in Madras, says: "This dangerous disease *cholera morbus* is the same we had in Tricomalee." In 1770 it was endemic in Arcot and Travancore,

and in April 1783 it was supposed to have killed 20,000 in Hardwar (Macnamara).

Bryden, who was the statistical officer with the Sanitary Commissioner, published his voluminous report in 1874 and gives a clear description of repeated instances where cholera spread from what he terms its "epidemic home" in Lower Bengal across India by two main routes described by him as the northern epidemic highway up the Ganges valley to Afghanistan and Persia, and the southern epidemic highway across the Central Provinces to Bombay, Madras and Ceylon.

In no single year during the period 1817-1872 did cholera spread in the reverse direction and in no single year was Bengal free from the disease. I attach two maps (Maps II and III) copied from many published by Bryden, showing the east to west spread. In these two maps I have cross-shaded the area always coloured in old reports as the area of endemic cholera.

The Civil Surgeon of Lahore writes in 1879 (*vide* Report of the Sanitary Commissioner, 1879):—

"The experience of many epidemics has satisfied me that cholera never arises spontaneously in Lahore. In all the epidemics which I have known it has travelled up-country and has been regularly traced along the Grand Trunk Road or railway. Hence, in the present day when cholera is heard of at Umbala or Phillour, we know pretty certainly that sooner or later during the same season it will reach Lahore. In former years it was often some weeks in travelling from Umbala to this place, but now that the railway is open, it comes within a few days."

The Sanitary Commissioner remarks "there has never been recorded an epidemic travelling to Lahore from Multan on the south-west or from Peshawar on the north-west."

Cholera of past 50 years.

There can be no doubt as to the part played by India in originating the great pandemics of the past nor of the fact that Bengal was the starting point in India itself. How far is that still the case?

A study of the cholera mortality statistics from 1899 onwards which are published in annual reports of the Public Health Commissioner with the Government of India show plainly that there is little change in the situation.

I have put the figures into Graph No. 1, illustrating separately the mortality of Bengal, United Provinces, Central Provinces and Bombay.

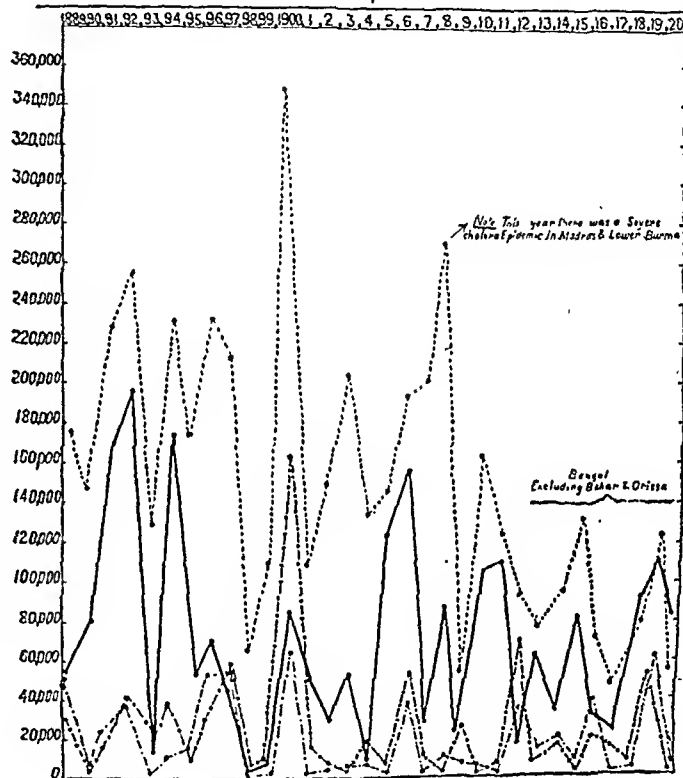
The Bengal curve shows that no single year of the period under review has shown a mortality of less than 40,000 persons in Bengal. The years 1892, 1900 and 1908 are notable epidemic years, and there are many years of smaller epidemics. The curve also shows the wide variation from year to year, and it is noteworthy that there appears to be no tendency for the mortality of one year to influence that of the next. The worst

epidemic year, 1900, was preceded and followed by years of comparative health. An examination of the United Provinces curve shows that there is a definite correlation with that of Bengal.

The year 1900, which was a famine year, is particularly interesting as the United Provinces is not so much influenced as Bombay, and this epidemic seems to have followed what Cunningham and Bryden in the old reports called the "southern epidemic highway" through the Central Provinces to the west coast of India. In the years 1892 and 1894 the northern epidemic highway through the Ganges valley was followed.

It would seem that during the past 50 years a high cholera mortality in Bengal coincides with a

Graph No. 1



CHOLERA MORTALITY CHART FOR 30 YEARS BY PROVINCES

Bengal Bombay
U. Provinces Central Province

high cholera mortality in other parts of India in the same year. There appears to be no record of any province suffering a bad epidemic in a year when Bengal cholera was moderate. Can we avoid the inference that Bengal is the culprit? If it is, the district cholera mortality returns should show repeated movements of epidemics from East to West. In the days before railways such epidemic movements were easy to trace. Bryden reports how epidemics left Bengal and infected a near-by area; this area became a seat of epidemic next year and spread forward north-west and south with great regularity. Now the movement is more rapid. The report of the Sanitary Commissioner for India (1900) says that in the later months of 1899 and in the early

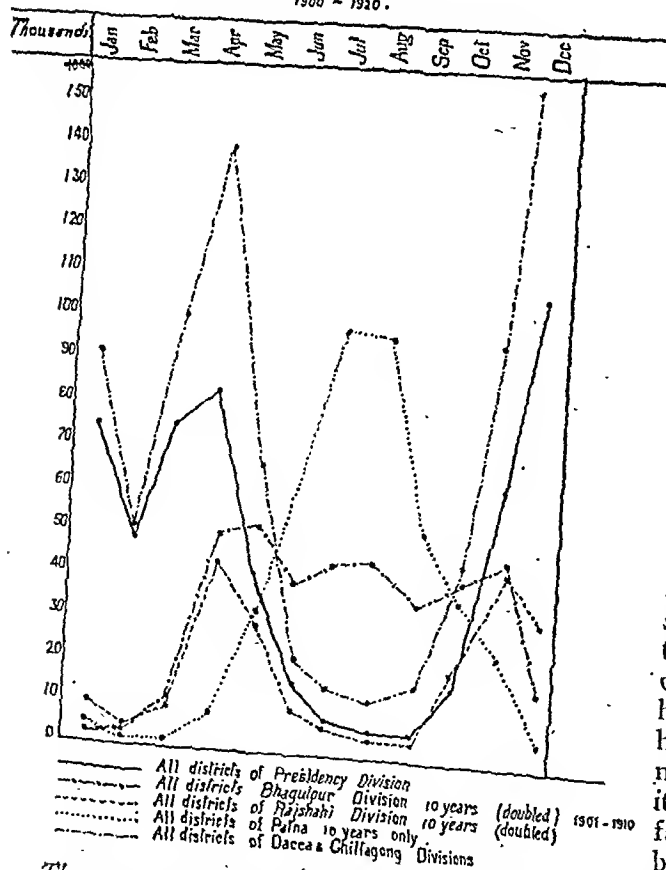
months of 1900 cholera was severe in Bengal and Assam, but that in April that year epidemic cholera broke out in widespread fashion, appearing in the Khyber and at Cabul in June, and in Kashmere in August. The epidemic was at its highest by June in the United Provinces, and in July in the Punjab. The quick jump to the Khyber and Cabul is reasonably explained by the rapidity of railway travel and we know of the considerable efflux of Cabuli traders from Calcutta in the spring. Increased facilities for trade and the fondness which Indians have cultivated for railways and movement have altered the situation, and it cannot be shown that cholera sweeps steadily west from Bengal, and it is doubtful whether other parts of India are not establishing endemic centres of their own. The much bigger attendance at religious festivals—so well known for their influence in spreading cholera—and the dispersal of infection in all directions from these must in many cases reverse the direction of flow.

The endemic area.

Graph No. 2 shows the seasonal prevalence of cholera in the various divisions of Bengal. Seasonal prevalence is very constant.

Graph No. 2

Monthly mortality curve for combined 21 years
1906 - 1920.



The most easterly parts of the province are the Chittagong and Dacca divisions. Here the months of maximum mortality are the two dry, cold, winter months of December and January. There is a secondary peak in April.

The curve of the Presidency division follows the Dacca curve very closely.

The curve of the Patna division shows a complete reversal of seasonal prevalence. There is only one peak, and that is in the monsoon months of August and September. In the four cold weather months there is no cholera. This conforms to the seasonal incidence of the United Provinces.

The curve of the Rajshahi division which is that part of Bengal Proper north of the Ganges conforms fairly well to the curve of South-East Bengal.

It is in the Bhagulpur division, between Rajshahi and Patna, that the change of seasonal incidence takes place. The curve for the whole division shows a transition stage, and when one comes to statistics of individual districts the change appears between the Purnea and Bhagulpur districts. The Purnea district is liable to severe spring cholera, and in Bhagulpur and further west the summer rainy season is the worst cholera time.

This line is precisely that marked by the earlier writers as the western limit of the endemic area.

It is noticeable that in this division not only does the seasonal incidence change, but the endemic cholera of Eastern Bengal changes to epidemic. In 1900 there was a violent April epidemic in Purnea followed by a less explosive but none the less severe epidemic in Bhagulpur which lasted through the summer. In all, some 60,000 fatal cases occurred. The next year there were only 862 deaths in the two districts combined. Such a wide variation from year to year is not found in Bengal proper.

It is not easy to trace by statistics movements of cholera month by month from east to west. It can be done some years from one district to the next and even from one division to another, but I have not been able to get correlation tables except by selection. Still we have enough evidence to show that the Bengal delta is still the home of endemic cholera and this still spills over to the western districts.

The present day.

The latest monthly epidemiological report of the Health Committee of the League of Nations states that Java, the Malay States, Indo-China, the Philippines and Siam, all countries where cholera might reasonably find an endemic home, have a few sporadic cases only, and the rest of the habitable globe is free. Yet India is reporting many thousands of deaths each month. Why is it that cholera should attack these countries and fail to establish endemicity, whilst Bengal has been highly endemic without a break for over 100 years? Why should Bengal be the endemic home and not Madras or Bombay?

We know that the cause of cholera is the vibrio of Koch. We know that it is a delicate organism which can withstand cold but not heat, desiccation or sunlight. Greig's experimental work

proved that rice-water stools containing as they do a pure culture of the cholera vibrio, even if kept in the dark, become sterile in four days. How then does infection persist through the rains in Eastern Bengal? Graph 2 shows the cholera mortality curve typical of Eastern Bengal districts. From June to October very few cholera deaths are reported. These are the rainy months when Eastern Bengal is mostly under water except for the raised villages. Yet year after year as soon as the land dries up cholera re-appears in mild epidemic form. If there have been tornados and tidal waves bringing salt water into the rivers and tanks, then as in 1876 and 1897 the cholera assumes fulminant epidemic proportions. After the devastating cyclone of 1897 the Chittagong district suffered 21,000 deaths from cholera in the following 12 months. These Eastern Bengal districts where cholera is so persistent have a heavy rainfall. December and January are the only dry months. They are fertile and support in comfort a population of 800 to the square mile. This density of population must be a factor.

An account of the Faridpur district is found in a book by the late Major J. C. Jack, I.C.S., entitled "The Economic Life of a Bengal District." He gives the following figures illustrating economic conditions:—

| Classified as living | Families. |
|----------------------|-----------|
| In comfort .. | 167,139 |
| Below comfort .. | 96,294 |
| Above indigence .. | 63,969 |
| In indigence .. | 14,706 |
| Total | 342,108 |

Though a certain number of families are described as living in indigence, yet these by dint of menial subsidiary employment are far removed from starving point, and famine,—that great associate of epidemic cholera,—does not occur in these Eastern Bengal districts.

Drinking water supplies.

The Eastern Bengal districts are entirely agricultural; towns hardly exist and the villages are more groups of hamlets than close-packed villages as in Upper India. The land is the latest part of the delta formed, and is flooded in the rainy season. The villages or hamlets, therefore, are all built on artificial mounds. Major Jack writes:—"The south-west part of the Faridpur district is a vast marsh, yet in the last century population has flocked to this basin to such purpose that this dismal swamp now contains 800 people to the square mile. For 8 months of the year the country is a lake 700 square miles in extent, whose surface is broken only by the village clumps and by the narrow strips of land which mark the course of the streams; in the other four months large parts dry up and enable crops to be grown or gathered. When a village is first founded a tank is dug and the earth from it heaped up until banks are raised above flood level." This tank serves all domestic uses,—bathing,

cooking, and washing clothes, as well as drinking water. In some of the better class hamlets a second pond is reserved for drinking water supplies.

With such a water supply it is easy to understand how an epidemic can spread. It is less easy to explain why endemic cholera persists.

Can it be a matter of chronic carriers and a community with a high degree of acquired immunity sensitized by the onset of the cold season which lowers their none too abundant vitality? The existence of the carrier has been proved by Greig and others, but the existence of the chronic carrier analogous to the enteric carrier is denied by some. Greig has proved that the mucous membrane of the gall-bladder is sometimes severely affected, and I have personally isolated a vibrio—indistinguishable from the cholera vibrio—from a man suffering from recurrent colic, from whom no history of a cholera attack could be elicited.

To theorise is fatally easy. To establish a theory such as I have enunciated would need a prolonged spell of field work in the endemic area, examining alvine discharges of great numbers. It might be that during the off season, from May to October, the vibrio is attenuated by conditions of temperature and humidity and becomes a normal inhabitant of the bowel of immune persons. This is again theory, but we do know that many persons are infected without suffering with the disease. Greig showed that 6 out of 27 contacts at Puri were excreting vibrios. The Japanese Port Authorities at Moje examined 120,000 immigrants and detected by bacteriological methods 8 cholera cases and 11 carriers.

Hirsch quotes the mortality of epidemic cholera in East Africa and shows that the mortality was affected by race:—

6.5 per cent. of the total Hindi population died.

10 per cent. of the total Arab population died.

25 per cent. of the total Negro population died.

It is not unreasonable to suppose that racial and acquired immunity may be responsible for a large number of chronic carriers or ambulatory cases.

Given a starting point in these eastern districts and an explanation of the "carry over" season it is not difficult to see how cholera gets a good send-off each cold weather. The dry season is the season of movement. Jack states that "during the dismal period of the rains water is everywhere and all men go afishing and lead an idle life. From December to February all are engaged in cutting the winter rice crop, and there is much emigration and immigration of hired labourers who are hired, lodged and fed for a week or more."

This movement and aggregation of labour is a factor to be considered. Much labour comes from the north-west, i.e., the neighbouring

districts of Nadia and Jessore. These labourers returning in February certainly take cholera with them.

Calcutta has had yearly and monthly a high cholera death-rate for many years. Rangoon, though outbreaks frequently occur, has not suffered to anything like the same extent. Similarly, Singapore, Bangkok and other eastern ports have never suffered such continuous endemicity, though the factors of mean winter temperature, humidity and soil moisture are every bit as suitable as in Calcutta.

Similarly, the disease, though frequently introduced into the West Indies and Central America, has never established an endemic home as it has in Eastern Bengal.

Therefore there must be some epidemiological factor peculiar to Bengal and Calcutta which fixes the disease here. Racial susceptibility, density of population, economic conditions have all been discussed above. The Indian,—from Hirsch's records,—seems to be much less susceptible than the Negro races. Jack's book shows that the economic condition is good. Density of population is undoubtedly a factor, but I believe the main one to be the habits and religious customs of the people.

In Bengal every man and woman takes a daily bath in the open,—winter and summer,—standing in the water well above the knees and at intervals completely immersing the whole body. A single cloth of some size is worn by both sexes, and it is the common practice to wash this garment at the same time in the same water. In nine cases out of ten the water for drinking and cooking is derived from the tank in which all wash. If a crowded community contains one cholera carrier, there is a daily re-infection of the water. Should a case die of the disease the body itself is in all probability prepared for funeral rites and washed on the banks of the pond or river; the clothes of the deceased person also.

In addition to the daily bath, the Hindu section of the community during their ceremonial ablutions drink of the water. In Calcutta the water of the Hooghly and Tolly's Nullah being part of the sacred Ganges is drunk by many, though there is piped water of good quality available.

That carelessness in regard to drinking water is the cause of endemic cholera is supported by the following facts:—

(1) The home of endemic cholera is in those districts where water supplies are from rivers and tanks, and where wells are not used, such as Lower Assam and South Eastern Bengal. As recorded in the *Gazetteer* of the district of Chittagong, in the two years where rivers and tanks were filled with salt water during a tornado, there immediately followed an epidemic of cholera and the cause given is the shortage of drinking water.

(2) The reports of the Health Officer of Calcutta show that those wards which border on

the River Hooghly or Tolly's Nullah have year by year the highest cholera mortality. In his annual reports the Health Officer includes a "black list" of those wards with the highest cholera mortality, and Wards V, XXV, and XXIII, which are riparian, invariably figure in this list. He says in his report for 1922 that "the heavy incidence of the disease on Hindus whose religion enjoins bathing in the river and Tolly's Nullah corroborates his view that a large proportion of the cholera of Calcutta is water-borne. Besides the tanks and river the unfiltered water-supply intended only for flushing drains is freely used by the ignorant and careless for domestic purposes."

Summary and Conclusions.

1. India may still be regarded as the home of cholera and deltaic Bengal may still be considered the endemic home where endemic cholera is just as regular and severe as ever.
2. That there is a fair body of evidence to show that cholera in the rest of India is dependent on cholera in Bengal, but owing to increased facilities for and rapidity of travel, it is not so easy to trace the spread.
3. Why deltaic Bengal is the endemic home of cholera is not proved. It is obvious that density of population, conditions of humidity of air and soil, and of winter and summer temperature are suited to the requirements of the infecting agent, and that the notorious carelessness of the people regarding their drinking water favour its spread; but we want to know to what extent the "chronic carrier" exists.
4. That the deltaic region of Bengal is the place where cholera should be attacked. Of all preventable diseases cholera is the easiest to tackle, and could we get to grips with it in this region, we might ultimately wipe it off the earth.
5. I suggest intensive vaccination in a selected district and a very rigorous propaganda campaign. If this is successful, to extend it throughout the province.
6. It is our very obvious duty to take the most stringent measures at our ports and frontiers to prevent the spread of the disease.

PRELIMINARY OBSERVATIONS ON ACQUIRED DISEASES OF THE HEART AND AORTA AS MET WITH IN BENGAL.*

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THE observations I have recorded in this paper are based upon a series of 446 cases examined by me during the course of hospital and private practice in this city, extending over a period of ten years. From the table containing the statistics of the different varieties of cases it will be

*Being a paper read at a meeting of the Medical Section of the Asiatic Society of Bengal on the 11th of March, 1925.

TABLE.

*Disorders of the Heart seen in Bengal from July 1915 to March 1925. 446 Cases.**Different Varieties.**Numbers.*

| | | | | | | | | | | |
|------------------------------|----|--|----|--|----|----|----------|---|----------|----|
| Pericarditis .. | { | Due to rheumatic fever .. | .. | .. | .. | .. | .. | 4 | | |
| | | As terminal event in nephritis .. | .. | .. | .. | .. | .. | 2 | | |
| | | Due to puerperal infection .. | .. | .. | .. | .. | .. | 1 | | |
| | | | | | | | Total .. | 7 | | |
| Arrhythmias .. | { | Extrasystoles .. | .. | .. | .. | .. | .. | 37 | | |
| | | Paroxysmal tachycardia .. | .. | .. | .. | .. | .. | 6 | | |
| | | Auricular flutter .. | .. | .. | .. | .. | .. | 4 | | |
| | | " fibrillation .. | .. | .. | .. | .. | .. | 14 | | |
| | | Heart-block .. | { | Complete .. | .. | .. | .. | 5 (of whom 2 suffered from Stokes-Adams' syndrome). | | |
| | | | | | | | | | | |
| | | Incomplete .. | { | Pneumonia .. | .. | .. | .. | 23 | | |
| | | | | Typhoid .. | .. | .. | .. | 8 | | |
| | | | | Dysentery .. | .. | .. | .. | 6 | | |
| | | | | Influenza .. | .. | .. | .. | 4 | | |
| Malaria .. | .. | .. | .. | 2 | | | | | | |
| | | | | | | | Total .. | 109 | | |
| Disorders of the myocardium. | { | Angina .. | { | Due to coronary sclerosis .. | .. | .. | .. | 5 | | |
| | | | | Exhaustion of heart muscles .. | .. | .. | .. | 35 | | |
| | | | | | | | | | Total .. | 40 |
| | | Dilatation .. | { | Due to secondary anæmia of bleeding fibroid .. | .. | .. | .. | 20 | | |
| | | | | Bleeding piles .. | .. | .. | .. | 12 | | |
| | | | | Kidney disease .. | .. | .. | .. | 9 | | |
| | | | | Pure anxiety and worry .. | .. | .. | .. | 6 | | |
| | | | | | | | | | Total .. | 47 |
| | | Degeneration of the myocardium as the result of heat, poor diet and infections like cholera, dysentery, malaria and kala-azar .. | | | | | | | 127 | |
| | | Acute .. | { | Due to rheumatic fever .. | .. | .. | .. | .. | 16 | |
| Influenza .. | .. | | | .. | .. | .. | 5 | | | |
| Small-pox .. | .. | | | .. | .. | .. | 3 | | | |
| Measles .. | .. | | | .. | .. | .. | 2 | | | |
| Diphtheria .. | .. | | | .. | .. | .. | 1 | | | |
| Typhoid fever .. | .. | | | .. | .. | .. | 1 | | | |
| | | | | | | | Total .. | 28 | | |
| Endocarditis .. | { | Chronic .. | { | Rheumatic origin .. | .. | .. | .. | 17 | | |
| | | | | Syphilitic origin .. | .. | .. | .. | 4 | | |
| | | | | Degenerative type .. | .. | .. | .. | 8 | | |
| | | | | Idiopathic variety .. | .. | .. | .. | 6 | | |
| | | | | | | | | | Total .. | 35 |
| Bradycardia due to .. | { | Malignant .. | .. | .. | .. | .. | .. | 6 | | |
| | | high arterial tension .. | .. | .. | .. | .. | .. | 4 | | |
| | | Heart of Graves' disease .. | .. | .. | .. | .. | .. | 4 | | |
| | | Tobacco heart .. | .. | .. | .. | .. | .. | 36 | | |
| | | Alcoholic heart .. | .. | .. | .. | .. | .. | 3 | | |
| | | | | | | | Total .. | 43 | | |

evident that structural lesions of the heart and aorta due to acquired diseases as met with in Bengal differ as widely from those that are seen in the different clinics of Europe as the hieroglyphics of Egypt differ from the picture writings of Mexico.

Chronic endocarditis, whether in the young or in the old, which is so frequently seen in Europe is certainly less common in Bengal. Consequently the familiar red faces of mitral disease and the staring looks and pale appearance of aortic regurgitation so common in the clinics of Europe are conspicuously rare in Bengal; the former is rare because rheumatic fever which is, *par excellence*, a disease of the cold climate is a rare affection of the people of this province; the latter is less common because granular kidneys, alcoholism and athletic strain are much less

often observed here than in Europe. The degenerative type of chronic endocarditis is also seldom met with as the majority of the people of Bengal hardly attain that age in which it is commonly prevalent. In cases of rheumatic endocarditis seen in Europe the prognosis is very often grave because the infective process—like pneumococcal infections—has the morbid tendency to recur, and we are fortunate in this country in this respect as recurrences are comparatively infrequent; yet in spite of this, chronic endocarditis—whatever may be its ætiology—very often runs a rapid course and compensation soon fails, which is just the converse of what is generally seen in Europe. Another type of acquired chronic endocarditis which I observed in my series was the idiopathic variety which affected chiefly the young males and sometimes

the females, and which damaged either of the two orifices almost equally and in whom rheumatism and syphilis could be definitely excluded.

In the ætiology of acute endocarditis in Bengal in my series of cases, influenza, small-pox, measles, diphtheria, typhoid fever and sometimes streptococcal infections—specially when of puerperal origin—ranked next to rheumatic fever in their respective frequency in the order in which they have been mentioned. In the case of enteric where acute endocarditis was present it could be attributed to the secondary streptococcal invasion.

For obvious reasons rheumatic pericarditis was rare, and when present very often co-existed with myo- and endocarditis. In a few cases of nephritis it was seen as a terminal event.

In the heart-kidney complex met with in Bengal the heart is responsible for the kidney disease in many cases, which is just the opposite of what is commonly seen in Europe.

If we define angina as coronary sclerosis then, of course, such anginas are seldom met with in this soil as it very often consorts with arteriosclerosis which is comparatively rare. If on the contrary, as I pointed out a few years ago, we look upon the symptom-complex as an expression of exhaustion of the heart muscle then such anginas—for reasons given below—are by no means uncommon.

The extra-systoles observed in my series of cases were to a great extent of reflex vagal origin. The eccentric heart manifesting such arrhythmias as paroxysmal tachycardia, auricular flutter and auricular fibrillation was rare compared with those seen in Europe. A notable feature in some cases of auricular fibrillation that came under my observation was absolute regularity of the pulse in striking contrast with the occasionally irregular pulse very often seen in such arrhythmias. And from what I have seen of these irregularities I can definitely say, from the polygraphic tracings I took of some of them, that such irregularities could often be linked in one chain. The different types were but manifestations of different grades of one and the same disorder which was very often an eccentric focus of irritation within the heart muscle. When that focus was mild it produced extra-systoles; when moderate, paroxysmal tachycardia; when severe, auricular flutter; and when serious, fibrillation.

Real cases of complete heart-block and Stokes-Adams' disease were very rare, and for the former malady—when present—syphilis was mainly responsible. Partial heart-block as the result of such infections as pneumonia, typhoid fever, bacillary dysentery and very rarely malaria was certainly not uncommon. Bradycardia purely due to high arterial tension—so common a feature in the European clinics—was seldom seen.

The poisoned heart of Graves' disease was very occasional. Seeing that the principal types of diseases of the heart prevalent in Europe were uncommon in my series of cases, it might

very well be asked "Is heart disease then uncommon in Bengal?" No! The majority of the people of Bengal suffer from one of the most serious types of heart lesion, namely, myocardial disease of the heart. We all know by this time that the endocardium constitutes anatomically a very small portion of the heart, and that the prognosis of endocarditis depends largely on the condition of the myocardium. It is this vital structure that is the seat of disease in the overwhelming majority of the cases seen in Bengal. It is not, strictly speaking, a myocarditis but a degeneration of the myocardium absolutely independent of coronary sclerosis, and this degeneration is responsible for the early death of its people. It symptomatically manifests itself in the lack of physical endurance so well known amongst the Bengalis that it hardly merits a detailed description. Clinically it attracts the notice of the physician by a rapid rate of the heart, the pulse very often ranging between 80 to 90 per minute at rest. Some degree of hyperæsthesia over the precordium was present in many cases. The apex beat was very often difficult to localise, X-ray examinations seldom revealed dilatation, On auscultation the first sound was very often muffled and tonic murmurs, as was pointed out by me some time ago, indicating a toneless flabby myocardium could often be heard, as also the basal systolic murmurs. In a limited number of cases the pulmonary second sound was also accentuated. Such patients very often exhibited effort syndrome.

It is thus evident that there is a fundamental difference between the types of heart disease prevalent among the inhabitants of the countries in question. And what constitutes this difference?

The cardinal factor responsible for this difference is the climate. This was very ably pointed out as long ago as the year 1910 by Lieutenant-Colonel J. W. D. Megaw, r.m.s., in an excellent paper on this subject contributed by him to the *Indian Medical Gazette* for March. He said "debilitating climatic conditions are distinctly calculated to bring about early enfeeblement of the heart"; the reference was to Anglo-Indians and domiciled Europeans. There could be no gainsaying that high air temperatures produced vasodilatation which threw greater work upon the heart and thus drew largely upon the cardiac reserve. It made the people lazy and lethargic, the majority of whom consequently did not take proper exercise and thus rendered the ill-nourished heart—like the arm in a sling—to waste from want of proper blood supply. The factor next of importance in the production of a degenerated myocardium is the poverty of the masses from dearth of industrial developments in this country. As a matter of fact, the chief disease of Bengal is inanition. Poverty demoralises the myocardium chiefly in two ways, the first of which is the inferior quality of the food that is consumed,

While I do not concur with Lieutenant-Colonel D. McCay that the nitrogen-poor diet markedly affects the physical growth of the people of Bengal for the simple biological reason that the elephant, whose diet is certainly poorer in nitrogen than the tiger's, is unquestionably much more developed than the tiger, I fully agree with this eminent observer that large quantities of unassimilable proteid in a Bengali diet leave enormous nitrogenous residue in the intestines which furnishes a fruitful source of intestinal putrefaction and toxæmia; nor is the quantity of food which is necessarily enormous less important in this direction. Such monstrous alimentation leads to visceroptosis and intestinal stasis. The natural consequences of such a diet are intestinal catarrh and diarrhoea, dysentery, and septic ulceration of the gums—all of which are well-known common disorders of Bengal. The combined effect of climate and poverty leads ultimately to a change in the physiology of the Bengalis materially from that of the Europeans, and such changes in the blood as diminution of the percentage of hæmoglobin are well known. Since in the effective maintenance of pressure in the tubes the condition of the pump is important, we find a low blood pressure amongst the Bengalis which is the direct result of a myocardium which is ill-nourished as a result of anæmia consequent upon the gastro-intestinal infections noted above.

The climate also markedly changes the pathogenesis of diseases present in the two countries. Indeed, Bengal is the best natural incubator I have ever known for the growth and development of bacteria on account of its heat and moisture. All the four scourges of Bengal, namely, cholera, dysentery, malaria and kala-azar damage the myocardium, whose vitality—for reasons given above—has already been sapped. A vicious circle is thus established—anæmia, infection anæmia—and the heart thus becomes progressively weak. Infection damages the heart in two ways; in the first place due to temperature which quite apart from the insufficient food and imperfect metabolism it enforces upon man, directly damages the delicate parenchyma and indirectly exhausts the heart by vasodilatation. The next factor is the toxin which acts directly on the cells and indirectly by the resultant hæmolysis and anæmia. Such infections as beriberi and very often filarial fevers do not spare the myocardium, and if they are less important than those mentioned above, it is because their incidence is less. The infrequent consumption of alcohol by the Bengalis is of no advantage to the heart muscle as it is made worse by the various forms in which tobacco is used, as also opium and in some cases, at least, *bhāng*.

It thus happens that infections common to all climates, such as influenza, pneumonia, enteric and diphtheria, which are notorious in attacking the cardiac musculature—when they visit the Bengali homes find a ready soil and often create

disaster. The Bengalis thus die prematurely as the result of such infections as compared with the Europeans who, as a rule, stand infection better and attain to a much older age.

What the exact nature of changes in the myocardium is, I shall be able to say at a later date when I have concluded my observations on the pathological examination of the cardiac muscles of the Bengalis, the investigation of which I am at present engaged in.

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A NOTE ON THE EFFICACY OF NEEM-BATTIS IN THE DESTRUCTION OF RATS AND RAT-FLEAS IN RAT BURROWS.

By C. D. TIWARI, M.B., B.S., D.P.H.,
and

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(From the Epidemiological Bureau, Punjab, Lahore.)

WHILE conducting some experiments on disinfestation of houses by fumigation with substances like cresol it was found that the fleas in the rat-holes were not killed and the rats were not at all affected. It would, therefore, seem reasonable that the rat burrows being the most likely places to harbour fleas, would act as protected reservoirs for these insects, which would infest the room after the disinfestation was over and thus defeat the object. In order to kill the rats and fleas in the burrows, Lane (1914) devised the *neem-batti*. A standard *neem-batti* as issued from the Punjab Plague Equipment Depot, Jullundur, is prepared as follows:—

Pot. chlorat. 2 dr., Pot. nit. 1½ dr. and sulphur 2 dr. are powdered together and mixed with 5 dr. of oil (any kind *Taramira-mustard*, castor-oil, etc.) to form a paste to which 1 dr. of chilli-powder (red pepper) and a handful of crushed dried *neem* leaves (*Azadirachta indica*) are added. A wick of about 9 inches, made of thick cloth (*khaddar*) is soaked in saturated solution of Pot. chlorat. The paste as prepared above is put over

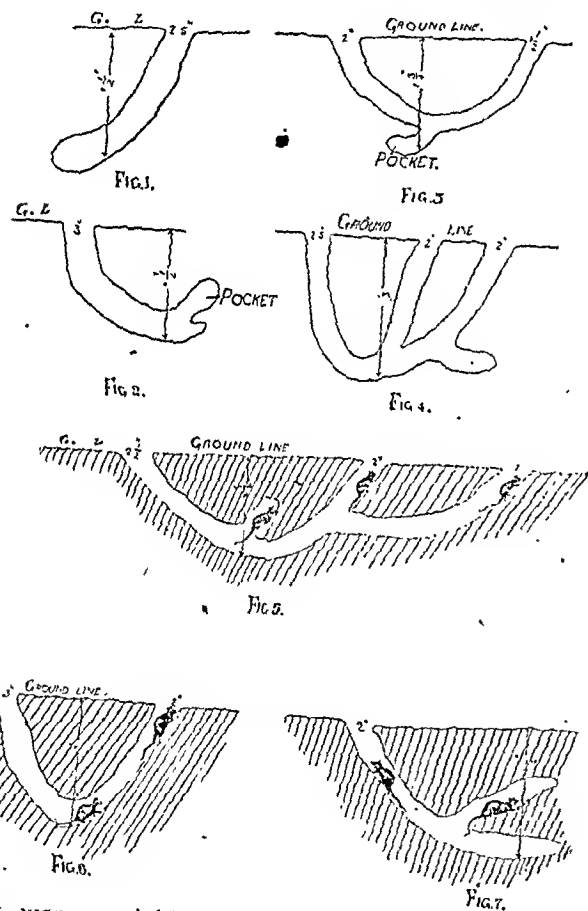
the wick leaving exposed about an inch of one end. The wick is then encased in cloth and a piece of thick paper wrapped over it. To use a *neem-batti* all openings except one opening of the burrow are closed; a *neem-batti* is then ignited and introduced into the open hole which is then similarly closed.

Under instructions from the Director of Public Health, Punjab, we conducted a series of experiments to study the efficacy of *neem-battis* in destroying rats and rat-fleas.

The experiments were carried out in natural rat-holes in the open fields which were found to be more convenient than the burrows in houses.

In order to determine the nature of the burrows thirteen rat-holes in alluvial soil were dug up and carefully examined. It was found that

VARIOUS TYPES OF RAT BURROWS.



they were variable in dimensions and designs and could be classified under the following groups:—

1. A simple oblique blind hole (Fig. 1).
2. A blind hole with a side pocket (Fig. 2).
3. A burrow with two or three openings with or without pockets (Fig. 3).
4. A complicated burrow formed by the intercommunication of two or three burrows (Fig. 4).

The diameter of the openings was between 1½ inches to 3 inches and the maximum depth below the ground was 3 feet. The distance

between two openings varied from 2 to 8 feet.

General plan of experiments.

A rat-hole was selected in the field and all the holes near-by, except one, were closed with iron sheets and clay. Two rats with living fleas on their bodies were let in through this opening. A *neem-batti* was then lighted and introduced into the hole which was then similarly closed. The *batti* was allowed to smoulder in the closed burrow for varying periods of 5 to 10 minutes. The burrow was then dug up and search was made for the rats and the fleas and their condition was noted.

In a series of eight experiments conducted in burrows of all types, in four of which the *batti* was allowed to smoulder for 5 minutes and in one each for 6, 8 and 10 minutes, the rats and the fleas on the rats in all cases were found dead. Figs. 5, 6 and 7 show the situations in which the dead rats were found. It was also noted that every nook and corner of the burrow was blackened with smoke showing thereby that the smoke had penetrated all parts of the burrow.

Standard *neem-battis* and black rats (*Rattus rattus*) were used in all these experiments.

CONCLUSION.

Fumigation with *neem-battis* in the way described above kills the rats and the fleas on the rats in the burrows in the fields in 5 minutes.

CERTAIN ASPECTS OF LITHOLAPAXY.

By R. W. ANTHONY, M.B., C.M., F.R.C.S.E.,
LIEUTENANT-COLONEL, I.M.S.,

(Late Civil Surgeon, Hyderabad, Sind.)

My attention was directed some months ago to the article on litholapaxy by Lieutenant-Colonel A. J. V. Betts, I.M.S., in the *Indian Medical Gazette* for April, 1924. He gives a very lucid description of the operation, and I only write in the hope that my experience may help those not very familiar with the operation in one or two directions not dealt with fully by Lieutenant-Colonel Betts.

First as to my credentials: I have done over 2,500 litholapaxies mostly at Hyderabad-Sind which has attracted patients for this operation for some decades now. It has been the custom there to treat cases of vesical calculus as out-patients. The stone is crushed and the patient allowed to go home when he has recovered from his anaesthetic. I feel sure they would resent having to stay as in-patients now in any uncomplicated case.

In Sind, as elsewhere, stone is very common in children. I think the operation is easiest in them as one practically never has to deal with a bladder which has become loculated and out of shape. Unless they are deeply anaesthetised, however, they are very apt to strain and void the water which has been put into the bladder as a preliminary to crushing the stone. For this reason I have made it a practice to tie a bit of fine rubber drainage tubing round

the base of the penis. Thicker tubing is used for adults.

The small size of the urethra is a difficulty. For some years past I have been in the habit of dilating the urethra with Liston's graduated metal bougies. In a boy of 2 years of age a 4-7 passes as a rule with ease and the urethra can nearly always be persuaded to take a 5-8. If it does one can work very comfortably with a No. 6 lithotrite. If it can only be dilated up to No. 7 one has to use a lithotrite smaller than No. 6 and even then it fits too tightly for comfortable working. Of course no force must be used in the dilatation. Personally I have never ruptured a urethra.

In catching and crushing the stone and its fragments I think it unwise and unnecessary to rotate the beak of the instrument to one or other side. If the fragment is not exactly where you expect it to be, i.e., at the most dependent spot, it must be close to it to one or other side or in front or behind, and one can easily investigate these areas by slight movements of the handle to one or other side or by elevation or depression, the female blade being kept always on the floor of the bladder. Indeed, particularly in children, I have found this the most sensitive method of dealing with the last crushworthy fragment. I sometimes find a fragment thus after I have imagined the bladder to be clear with a sound.

The first litholapaxy operation I saw done was by the late Colonel Henderson, I.M.S. I wondered why when he had obviously caught a fragment he yet withdrew the male blade a little way once or twice and brought it down sharply again on the fragment. He explained that it was to make sure that no mucous membrane had been caught. When there is nothing but a fragment of hard stone in the jaws of the instrument there is, of course, no sensation as of a piece of interposed soft tissue. Doubts on this point are settled by the manoeuvre I have mentioned. Especially in a fasciculated or pouched bladder the danger of catching mucous membrane is by no means negligible. I have not seen this point touched on in any of the literature on the subject which I have read.

In children I have derived no advantage from the use of an evacuator. I can clear the bladder quicker by repeated filling and pressure over the bladder with the hand, the largest cannula passable being used. In bigger children, and if I have several stones to crush, I press out the fluid from the bladder with my left elbow applied over the pubis. It is a great saving in muscular effort. In adolescents and adults if I can pass a No. 12 or larger cannula I find the evacuator saves time and effort. As one acquires experience the scope of litholapaxy widens. I do suprapubic litholapaxy in about 1 per cent. and perineal litholapaxy in about

2 per cent. of cases now. Large size and hardness can nearly always be overcome. If the lithotrite will not lock I use a hammer. A few sharp taps will tell you if you are making any impressions on the stone. If you are using the largest lithotrite that will pass and the hammer does not help you, you must, of course, do the perineal or suprapubic operation. Phosphatic stones are easily dealt with by hammering. Uric ones often disintegrate and become less in diameter with patience and perseverance, but the expedient is of little use in the case of a large mulberry calculus. Such may be dealt with a No. 18 lithotrite and a hammer by the perineal route.

In hammering one keeps the caught stone pulled well forward, of course, and gives sharp taps on the top of the handle with the hammer. A heavy blow would drive the instrument and stone so far back as to injure the back of the bladder. In hammering with the ordinary lithotrite the difficulty is to keep the stone in the jaws of the instrument. One does it rather ineffectually by means of the thumb and index finger of the left hand on the screw thread. Also one is apt to injure the turning wheel with the hammer. I interviewed Weiss & Sons last year, and they are making me a No. 16 lithotrite in which the stone is kept gripped by means of a spring and which has a suitable anvil head for the hammer.

If the size of the stone necessitates it I use the hammer with even so small a lithotrite as No. 6. In this case, of course, the taps with the hammer have to be light. One soon sees if the stone is disintegrating and so making it likely that further cautious hammering will enable one to lock the lithotrite and crush the stone in the ordinary way.

CELLULITIS OF THE ORBIT.

By R. E. WRIGHT,

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and

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CELLULITIS of the orbit is a condition of great practical importance not only to the eye specialist, but also to the general practitioner. In a large number of cases if the condition is not diagnosed correctly and treated promptly, the vision, if not the eye itself, is lost. This is a serious matter although insignificant as compared with the loss of a life which must also be kept in mind as a possibility not too remote. It does not require very extensive surgical preparation to explore an acute orbit and there is no reason why it should not be undertaken successfully by the practitioner with the apparatus ordinarily at his disposal provided he knows how to go about

it. We have seen both eyes and lives lost through ignorance of how to deal with such cases and, as the condition is not rare, it may prove helpful to consider (even in a superficial way) some of the features which appear to us of practical value.

In speaking of orbital cellulitis we include not only diffuse and localised inflammation of the cellular tissues of the orbit, with pus formation, but also inflammations of the periorbita, subperiosteal abscess, and thrombophlebitis.

First it is essential to know something of the anatomy of the parts concerned. Surrounding the orbit on three sides, we have the accessory sinuses of the nose. The intervening bony wall is covered on the one side by the periorbita and on the other by mucous membrane. The inner bony wall presents many sutures where the periorbita is bound down and cannot be as readily elevated as on the roof or floor. This wall is very thin and may show dehiscences. In relation to it from before backwards, we have the frontonasal duct, the anterior, middle, and posterior ethmoidal cells. The frontal sinus is related to the roof, the maxillary antrum to the floor. Between the orbital rim and the globe in the superior temporal quadrant lies the lachrymal gland. In the superior nasal quadrant we have the superior orbital vessels and nerves, the trochlea, the tendon of the superior oblique, and the venous connections between the ophthalmic and angular veins. In the inferior nasal quadrant is the lachrymal sac, but it is sunk in its groove and covered with a fascia level with the bone. Here also is the inferior oblique stretching between the wall and the globe. The globe and its four recti form a cone which lies separated from the walls by a considerable interval, bridged across by the superior oblique tendon and the inferior oblique. The levator palpebrae superioris lies closely associated with the superior rectus posteriorly, forming part of the cone, but its tendon runs forward anteriorly in front of the conjunctival fornix into the lid. An incision deep into the superior fornix towards the orbital rim would cut it. It forms a plane between the muscle cone proper and the roof. The belly of the superior oblique stretches close to the bone along the angle between roof and inner wall from the trochlea to the apex of the orbit. It may be seen, therefore, that a free incision through the conjunctiva, except in the inferior temporal quadrant, would be liable to injure the structures referred to. Hence deep exploration through the conjunctiva is better attempted with a needle, or through an incision extended by a sinus forceps. Another interesting anatomical consideration is the connections of the orbital veins. Without going into details which may be culled from text books of anatomy, these may

be considered in several groups. The veins which connect up the orbit with the nasal sinuses; those which form anastomoses with the pterygoid venous plexus, and hence with the drainage areas of the tonsils, alveolar regions, and teeth; and those which link up with the superficial veins of the orbital region, notably the connections of the angular vein. One outstanding feature in considering the veins is the fact that the superior and inferior ophthalmic veins drain directly into the cavernous sinus, and that the former arises from two branches which enter the orbit above the internal tarsal ligament from the superior orbital and angular veins respectively. Hence blood from the lids and the orbicularis area as well as the superficial tissues of the nose, brow and cheek, may find a way through the orbit to the cavernous sinus.

Of the common causes of cellulitis met with here, infective processes originating in the nasal sinuses form a very important group. Our experience goes to show that infection of the ethmoidal cells is most liable to lead to invasion of the orbit; next in order come the frontal and sphenoidal cells, and lastly the maxillary antrum. For the most part then in orbital cellulitis due to nasal sinusitis, we are concerned with the superior and mesial walls and the apex of the orbit. A direct extension from the frontal sinus through the bone frequently results in a subperiosteal abscess which strips the periorbita from the roof and tends to point forwards beneath the brow above the plane of the levator. Such a condition is comparatively easy to deal with if seen before it bursts through the base of the lid. If it has opened thus spontaneously it may be difficult to prevent ectropion. When the ethmoidal cells are involved, however, it is frequently more difficult to form a diagnosis. For anatomical reasons given above, namely, the way in which the periorbita is adherent at the sutures of the inner wall, there is more commonly an invasion of the orbit rather than a formation of subperiosteal abscess. Apart from direct extensions via bone and periorbita, nasal sinusitis may lead to infection of the orbit through the venous channels which have been considered above. An infective process having penetrated the wall direct or by the vessels, may either form a definite abscess or a more diffuse cellulitis, largely dependent on the nature of the infecting organism. The veins may become extensively involved in which case one speaks of a thrombophlebitis. In either case there is the possibility of the channels leading to the cavernous sinus carrying the process to that important structure. Infections of the skin over the orbicularis region and the nose such as boils, styes or diffuse erysipelatous conditions may give rise to thrombophlebitis and cavernous sinus-thrombosis. A thrombophlebitis may, of

course, take place in the opposite direction (from the cavernous sinus to the orbit) as for instance in cases of middle ear infections. Other sources of local pyogenic infection are dental (maxillary) and tonsillar sepsis, and perforating injuries. Occasionally metastatic pyogenic infection occurs from a distant focus, and both syphilis and tuberculosis may attack the bony wall and its periorbita and extend to the orbit itself. Of the frontal sinus conditions associated with orbital abscess, syphilitic osteitis and periostitis with empyema is perhaps the commonest, but this is not of bad prognosis in so far as the eye is concerned. The abscess may point under the skin of the forehead or into the orbit and come forward along the levator just below the orbital rim. One must bear in mind that there are many cases of proptosis with chemosis, redness, and pain, which are not due to an infection of the cellular tissues of the orbit in its true sense. A slightly proptosed, highly inflamed eye may be due to tenonitis. Here the peculiar yellow colouration, boggy swelling of the conjunctiva, and the intense pain on moving the globe are suggestive. We have seen such conditions result from the careless use of subconjunctival injections, and in hospital practice one must be alive to this sequence as patients seeking advice at the hospital conceal the fact of previous injections. Acute lachrymal retention (dacryops), rapidly growing malignant tumours pushing forward under an inflamed conjunctiva, inflamed hydatid cysts, or *Cysticercus cellulosæ*, and panophthalmitis with a marked circumbulbar reaction, may all prove puzzling at times. Possibly the greatest practical difficulty in differential diagnosis is to distinguish between syphilitic osteoperiostitis and a subperiosteal abscess or cellulitis. It is of great importance to be able to do so, because syphilitic osteoperiostitis will quickly respond to suitable medication provided it has not already established a purulent sinusitis requiring nasal draining. Syphilitic inflammation of the periorbita and bone is of slow development; proptosis is less and there is marked localised tenderness of the bone, but of course this may not be detectable if there is a small posterior area of deep inflammation. In case of doubt it should not be forgotten that it is an easy matter to explore the orbit with a needle. The superior and inferior temporal quadrants may be searched freely through the conjunctiva right back towards the apex. It is a more difficult matter to explore the inner wall satisfactorily, but it can be done by passing the needle back parallel to the wall of the orbit above or below the caruncle. When pus is located then it will become necessary to expose freely the infected area. If pus is not located, it is for the most part better to open up the suspected region in a further endeavour to trace the focus

of inflammation and relieve tension. In either event the route to be followed is the same. If assured therefore that there is a septic process taking place in the orbit or if in doubt the safest procedure is to open it up freely and examine right back towards the apex. This leads us to the methods of opening the orbit which constitute the most important line of treatment of orbital cellulitis. To explore or drain the outer aspect of the orbit one may make a curved incision through the outer third of the brow parallel with the orbital rim and a short distance outside it, carrying the incision just below the canthal line over the malar bone, cutting through the skin and subcutaneous tissues right down to the periosteum. The latter can be carefully elevated as far forward as the orbital rim, and thence the periorbita separated both from the outer part of the roof—the outer wall—and the floor. In this way access may be obtained to a considerable portion of the orbit and it is a perfectly safe procedure. If nothing is found no harm is done and no deformity is caused in so far as the lids are concerned. If it is wished to extend the investigation, the outer bony wall may be removed to a greater or lesser extent. It is, on the other hand, a very undesirable procedure to make an incision through the skin parallel to the lower rim of the orbit because one is very liable to get lower lid adhesions and late ectropion. The floor can quite readily be explored and drained through the external incision. A pointing abscess may, of course, be evacuated through an incision in the conjunctival fornix and further extended with a sinus forceps, but such an opening tends to become valvular and the lid may hinder the escape of pus. In such cases it may be necessary to do an external canthotomy to relieve the tension of the lids and prevent the retention of pus. Exploration of the roof of the orbit may readily be made by incising the brow to the outer side of the supra-orbital notch, elevating the periosteum round the rim, and following it backwards along the roof. A most useful route of exploration and drainage is by the superior nasal quadrant which may be reached through a curved incision parallel to the orbital rim, starting just below the inner end of the brow mesial to the supra-orbital notch and continuing down the side of the nose half way between the attachment of the internal tarsal ligament and the middle line. The periosteum may then be separated back over the area between the supra-orbital vessels and the tarsal ligament. This must be carefully done, the trochlea being elevated with the periosteum and access thus obtained to the inner wall of the orbit. After the trochlea has been elevated care must be exercised in proceeding backwards. In the angle between the roof and the inner wall it is easy to progress towards the apex, but lower

down it is difficult to strip the periosteum without doing considerable damage. This method of approach to the inner wall of the orbit, the inner half of the roof and the orbital apex does not lead to subsequent deformity, it has the advantage of enabling the operator to deal with the frontal sinus and also the ethmoidal cells should they be involved. Such measures are infinitely preferable to making tentative explorations with a narrow knife through the conjunctival sac, and unless pus is definitely pointing in the conjunctival fornix such a procedure does not give sufficient drainage and relief from tension. A frontal sinus abscess which bursts through the roof of the upper lid may come to a natural cure without producing any very great deformity, because adhesions between the orbital rim and the tissues of the upper lid do not tend to cause such serious ectropion and exposure as scar tissue formation in the lower lid: still incisions through either lid should be avoided. Having made arrangements to drain the orbit it is of course necessary to deal with the source of the infection. Should this be of sinus origin, suitable drainage into the nose must be arranged for. If cavernous sinus-thrombosis sets in one is not left long in doubt and treatment is of no avail. The other eye becomes proptosed and cedematous and the patient dies. In cases of syphilitic osteoperiostitis and diffuse gummatous infiltration of the orbit, the free exhibition of antisyphilitic remedies quickly improves the condition.

The following cases illustrate some of the points mentioned above:—

LOCALISED CELLULITIS OF THE ORBIT WITH ABSCESS.

Case 1.—R., Hindu male, age 20, admitted on 25th May, 1924, with cellulitis of the orbit. History:—On the 12th March, 1924, a white spot appeared on the right cornea for which he was treated by subconjunctival injections. On 17th May, 1924, a few hours after the 12th injection the eye became swollen, protruded and very painful. For several days the eye was treated, and on the sixth day the doctor performed an exploratory operation, but no pus was found. On the eighth day the patient was admitted to this hospital and the orbit explored with a needle, with negative result. Pressure on the cornea was considerable and a transverse corneal erosion had formed just below the margin of the upper lid, so the patient was given an anæsthetic, an external canthotomy was performed and further exploration in the superior nasal quadrant revealed pus in the inner side far back. Exposed bone was felt near the apex of the orbit. Free drainage was effected; but eventually the eye was lost and had to be removed. The chief point of interest about this case is that the cellulitis supervened on subconjunctival

medication. If the condition resulted from subconjunctival injection introduced by a needle, it is hard to say why the main focus of suppuration should be so far back in the posterior ethmoidal region; possibly it was only a coincidence, or the infection may have travelled backwards by the venous channels. Had the abscess been evacuated in time, the eye might have been saved.

DIFFUSE CELLULITIS OF THE ORBIT.

Case 2.—T., Hindu female, age 16, O.P. No. 8875, was admitted on 6th June, 1924, with marked swelling, proptosis and chemosis of the right eye, and a history of having scratched a pimple on the tip of the nose on 1st June, 1924. By 4th June, 1924, there was marked swelling and pain with a bulging forward of the eye and an inability to close the lids. On 5th June, 1924, the conjunctiva was incised by a practitioner. On 6th June, 1924, the patient was brought to hospital and under chloroform the orbit was carefully explored with a needle. There was exposed bone in the superior nasal quadrant, but no pus. A free incision was made in the superior nasal quadrant, and external canthotomy was performed. The temperature at this time was very high and the patient had great pain and was inclined to be delirious. The temperature was controlled by ice packs. On 8th June, 1924, the temperature was still keeping up to 104°, and she complained of great pain on the right side of the head. There was marked swelling at the right side of the neck and parotid region. It was decided to explore the outer aspect of the orbit and a curved incision parallel to the orbital rim was made down to the periosteum which was then elevated from the outer wall. The outer wall was removed to the spheno-maxillary fissure and the pterygoid region exposed. No pus was found, but there was considerable reduction in tension and on 10th June, 1924, the patient's condition was slightly better. At this time the patient experienced great difficulty in swallowing, and it was found that there was marked swelling of the right tonsil, soft palate and the pillars of the fauces. The upper part of the tonsillar region was incised, and the enormously-swollen uvula removed. No pus was encountered. On 13th June, 1924, the patient received antistreptococcus serum and she showed distinct improvement on 14th June, 1924 and 15th June, 1924. On 16th June, 1924, the temperature rose again to 105°. Antistreptococcus serum was exhibited on the following day, and the patient treated by ice packs and cold sponging. There was marked abdominal tenderness and meteorism which was relieved by turpentine enemata. On 18th June, 1924, the temperature fell and continued to drop steadily until it came to normal about the 28th of the month. Meantime the globe itself had become infected through the

corneal ulcer, and the eye was eviscerated when the patient's temperature had come to normal. Early free incisions might possibly have saved the eye in this case. Fortunately streptococcal infections of this serious type are uncommon.

CAVERNOUS SINUS-THROMBOSIS.

Case 3.—A., Hindu male, age 22, O. P. No. 17594, admitted on 21st October, 1924, with high temperature and slight delirium, and marked swelling of the subcutaneous tissues about the right orbit, more particularly over the glabella where the skin was raised and fluctuating. Two or three small openings exuded pus near the tip of the nose and pus came from the right nostril. There was slight proptosis. The veins of the sclera and conjunctiva were engorged and the supra-orbital vein was full. An incision was made along the middle line of the nose down to the bone which was rough, the periosteum having raised by pus. The incision was carried round the orbital rim in the brow. Two other incisions were made on lateral aspects of the nose, the inner wall of the orbit was explored and pus found. Ophthalmoscopic examination of the right eye was impossible owing to the exposure ulcer. Examination of the left showed slight redness of the disc, no œdema. The pupils were active to light and inclined to be contracted; temperature 104° , pulse very rapid. The following morning there was a definite fullness of the subcutaneous tissues of the left eye, but no proptosis of the globe. The mental condition was much worse. The patient continued to sink and died at 5-40 P.M. on 23rd October, 1924.

Post-mortem Appearances.—There was suppurative ethmoidal sinusitis, purulent infiltration of the orbit with phlebitis and clots in the vessels. The cerebral veins were markedly congested and the brain was œdematous. There was a large area of purulent exudate beneath the membranes over the temporosphenoidal lobe. A considerable quantity of green pus lay round the infundibulum. The cavernous sinuses were filled with pus and clots. The infective process had extended into the rolandic area and also back beneath the tentorium and up towards the posterior region of the cerebrum on the right side. The left was not so extensively involved. The organisms found in the smear from the meningeal exudate were staphylococci and pneumococci.

THE ART OF THE INDIAN CHIROPODIST.

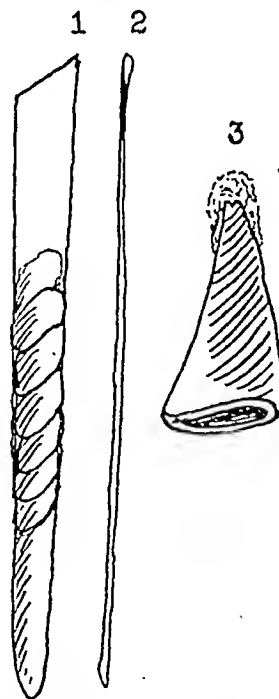
By R. L. SPITTEL, F.R.C.S. (Eng.),
Surgeon, General Hospital, Colombo.

IN Ceylon the itinerant Indian chiropodist enjoys a reputation for the removal of corns that surgeons might well envy.

The public, having come to consider corns as being more within the sphere of the chiropodist than the surgeon, seldom consult the latter for the ailment; and even when they do, the surgeon, more often than not, contents himself with prescribing salicylic collodions, corn-shields, or plaster-mulls—palliative measures at best—instead of performing a simple and radical operation.

Chircpody in the West stands on some foundation of pathology and asepsis. In the East it lies in the hands of ignorant individuals who, apart from any pretensions to asepsis, ignore even the rules of ordinary cleanliness, both in their person and procedure. It is all the more remarkable, therefore, that these quacks enjoy the vogue they do even among Europeans who do not grudge to pay them as much as five rupees for the removal of a single corn.

The chiropodist comes to your door carrying a little handbag—the only respectable thing about him. He submits for your inspection a number of letters of recommendation from his various patrons, telling, in more or less enthusiastic terms, of corns that have both been extracted and exhibited.



1.—A sharp oblique-edged chisel.
2.—A probe.
3.—A horn cup tipped with wax.

His *armamentarium* consists essentially of three implements:—(1) A sharp oblique-edged chisel, fashioned from the back of an old Kropp razor; (2) a probe; and (3) an assortment of conical horn cups, made from the hollowed ends of the antlers of some species of deer: these have a minute hole at the apex, and are capped with wax.

His method of *diagnosis* is simple. Running his hands over your feet, he pinches up

between thumb and forefinger any suspicious spot; should you wince when he does this, it is a corn he holds; if not, a mere callosity. He thus quickly demonstrates to you some four or five corns, where you thought you had only one. (Incidentally, payment depends on the number of corns removed.)

The operation. Seating himself on the floor, he asks for a cup of water. He scorns preparation of any sort. Grasping the toe in his left hand, he takes the chisel in his right, and, holding it pen-holder-wise, deftly thins down the corn with a series of light oblique strokes and thrusts, gradually working towards the centre. He fingers the whittled surface from time to time, testing its pliancy. When satisfied of this, using the acute-angled point at one end of the chisel's edge, he lightly incises the centre of the shaved area, just sufficiently to draw a little blood. Then, choosing a cup of suitable size, he makes patent the hole at its apex by passing a probe through it and the overlying wax cap. He next moistens the surface of the corn with a dab of water, and placing the cup on it, applies his lips to the apical hole and makes strong suction; then, quickly desisting, he pinches up the wax, obliterating the opening and creating a vacuum. The cup sticks and is left on for about five minutes while the other corns are being attended to. Towards the end of the operation three or four such cups adorn the feet. For bunions, bigger cups are requisitioned. The cups are finally removed and placed in a bowl of water. After a while they are taken up one by one and, with the point of the probe, a long adherent blood clot is dug out of each and proudly displayed as the extracted corns which, he now assures you, will never recur. He certainly has this to his credit, that, unlike more sophisticated chiropodists, he attempts to make a complete job of it at a single sitting.

He gives no instructions as to future shoes, etc. The operation over, he wipes his chisel and cups with a dirty rag and puts them away for use on his next patient. The wonder is that infection does not invariably follow. For this the patient has his own cleanliness more to thank than any precaution taken by the operator.

Nevertheless, there can, I think, be little doubt that this little operation, crudely done though it be, almost always confers immediate relief and often permanent cure. The little incision made at the root of the corn relieving tension there and allowing for the replacement of the epidermal core by fibrous tissue is, perhaps, mainly responsible for the good result. Certain it is, that the chiropodist is not so confident in his powers that he attempts complete removal of the epidermal plug,—a procedure that would involve more bleeding and pain than his reputation would warrant.

CANINE LEISHMANIASIS IN BOMBAY.

By Lt.-Col. R. ROW, M.D. (Lond.), D.Sc. (Lond.), O.N.E.
(From the F. D. Petit Laboratory, Byculla, Bombay.)

IN an interesting communication on this subject by Khan Bahadur C. R. Avari and Lieutenant-Colonel F. P. Mackie, I.M.S., published in the *Indian Medical Gazette* for December 1924, the authors do the writer of this memoir the honour of generously referring to his films which they had seen a short time previously from the lesions of a dog under his observation. Although it is rather late in recording the notes of these observations owing to his absence from Bombay, he takes this opportunity to do so.

The animal in question is a quasi-bulldog coming from Landikotal (N.-W. Frontier, India). On arriving here early in April 1924, she was found to have extensive ulcers on the lips, ears, nose and inner canthus of the left eye (Fig. 1).



Further there were a number of non-ulcerated lesions on the inner side of the ears looking like shining buttons of the size of large peas, very similar to the non-ulcerative forms of cutaneous leishmaniasis which the present writer showed to the War Hospital Medical Society, Bombay, some years ago in an Indian soldier returning from Palestine (Fig. 2).

The character of the ulcers and the nodules suggested cutaneous leishmaniasis at a glance, although the ulcers had greatly altered in appearance by septic infection set up by constant scratching by the animal. The preliminary

diagnosis was confirmed by the microscope. The accompanying microphotographs speak for themselves (Figs. 3, 4 and 5).

The ulcers healed up by September 1924, under treatment at Bai Sakerbai Veterinary Hospital, Parel, Bombay, leaving not a single scar.

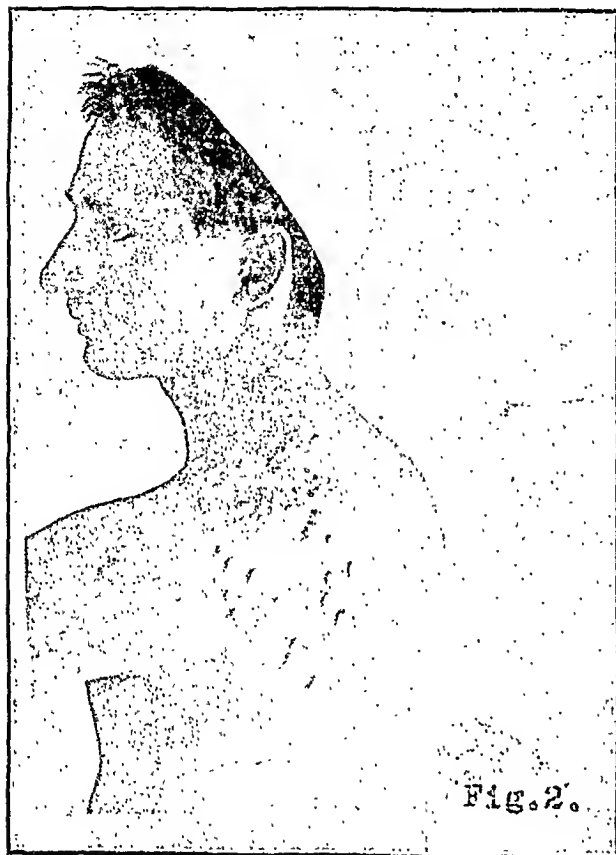


Fig. 3.

Fig. 4.

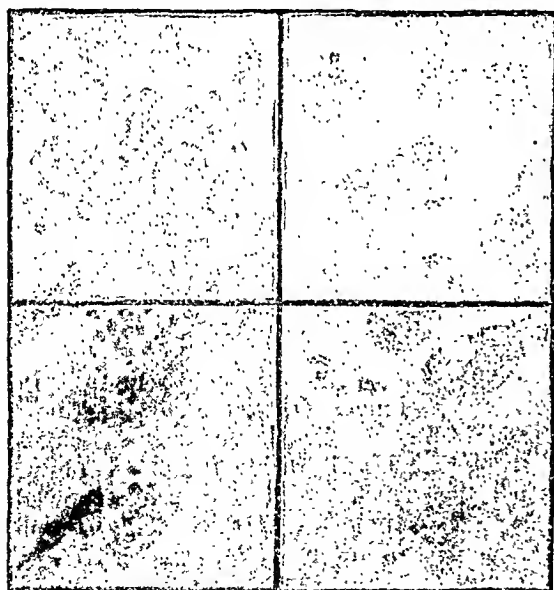


Fig. 5.

Fig. 6. (Human.)

The parasites show the morphological characters of *Leishmania tropica*. They are slightly larger in size than those found in man (Fig. 6), from

films fixed, stained and photographed under identical conditions of magnification and illumination. The cytoplasm appears not to be so dense and the micronucleus rod-like and seen always placed at an angle to the diameter of the nucleus. The parasites did not flagellate in NNN medium or Row's hæmoglobin saline prepared with rabbit's blood; perhaps media prepared with dog's blood might have given different results.

Animal experiments. Mice infected intraperitoneally did not take the infection (2 to 6 months after infection). Two pariah dogs infected cutaneously in the ear showed the following results:—

| | |
|---|------------------------------------|
| <i>Dog (1).</i> | |
| Infected intracutaneously. | 30-4-24. |
| Lesion first seen as slight redness. | 19-6-24. |
| Definite well-defined patch, size of two-anna piece raised above surface. | 16-6-24. (O-bodies found). |
| Ulceration of the patch. | 18-6-24. |
| Spontaneous healing of the ulcer without a scar. | 5-9-24. |
| <i>Dog (2).</i> | |
| Infected intracutaneously as in dog (1). | 30-4-24. |
| A very small flat nodule, size of split pea. | 19-6-24. (O-bodies found). |
| Ulcerated. | 5-8-24. (Very few O-bodies found). |
| Ulcer healed spontaneously without scar. | 15-9-24. |

As Avari and Mackie state in their note, canine leishmaniasis is rare in Bombay, and the nature of the lesions induced by the author and their spontaneous recovery in a short time leads one to the belief that the resistance to leishmaniasis in the pariah dog is strong. However, it is interesting to note that their dog came under observation about the same time and was found in the immediate neighbourhood of the veterinary hospital where the author's dog was kept as an in-patient. Is it possible that their dog got the infection from the patient through some unrecognised natural vector?

The morphological, cultural and infective characters of the dog's parasite seem to make it a distinct species from *L. tropica* of man.

SOME POINTS IN THE TREATMENT OF TYPHUS FEVER.

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DURING the past few years considerable interest has been aroused in the occurrence

of typhus and typhus-like fevers in India by the publication of observations by Megaw and other workers.

As a result it is now more generally realised that typhus fever is endemic in various parts of India.

In the hope that they may prove of some value to practitioners who may meet with occasional cases of typhus fever, the following notes have been extracted from my doctorate thesis written some five years ago.

Most textbooks render singularly little help with regard to the treatment of typhus fever, Osler for example merely stating that the general management of the disease is on the same lines as that of enteric fever, following up with a few remarks on the advisability of hydrotherapy and of supporting treatment.

As a result of an experience of some three hundred cases of typhus fever mainly amongst European and Indian soldiers in Mesopotamia and treated chiefly under good hospital conditions, one came to the conclusion that, although really good nursing plays a very important part in the recovery of patients from this disease, a great deal can be done to lower the case mortality by active therapeutic measures.

It is essential to realise that in typhus fever one is dealing with a disease which will last for a clear-cut definite period unlike enteric fever, in which one cannot, with any degree of certainty, predict the duration of the illness.

One can, therefore, afford to stimulate freely from a very early period in the illness, and at the Military Isolation Hospital, Baghdad, on the staff of which I worked for two years, we were in the habit of commencing the administration of digitalis derivatives and strychnine from the date of admission to hospital.

Brandy or champagne were also administered, provided that cerebral excitement was in no way increased by their use, and pituitrin came in useful to tide over emergencies.

The chief measures on which reliance was placed, however, were rigorous attention to the amount of sleep obtained by the patient during the earlier stages of his illness, the combating of the profound toxæmia by the use of normal saline solution,—often administered intravenously,—the treatment of severe headache with accompanying restlessness by lumbar puncture, and the cutting short of threatened attacks of venous thrombosis by the intravenous infusion of sodium citrate solution.

It is an unfortunate fact that it is still not generally realised that the advantages obtained by the administration of opium derivatives in the earlier stages of such acute illnesses as lobar pneumonia and typhus fever far outweigh the disadvantages.

A patient who has to face a week or two of acute illness as in typhus fever is in a much better position to stand the strain of the later stages of the disease if he has had several consecutive nights of sound sleep at the beginning of his illness.

Cold sponging, and, if the weather be not too warm, nursing in the open air or on a freely ventilated verandah are valuable aids to sleep, but experience has led one to place a good deal of reliance on morphine and atropine administered hypodermically, and to reject such drugs as paraldehyde and the bromides.

I can well remember the case of a middle-aged European physician admitted to hospital one evening suffering from typhus fever. The rash had just appeared, the patient was in a state of wild delirium and seemed very ill indeed. Enquiries made of the patient's medical attendant elicited the fact that the patient had had no sleep for over forty-eight hours. The effect of the administration of morphine sulphate gr. $\frac{1}{4}$ and atropine sulphate gr. 1-100 hypodermically and of cold sponging was most gratifying as the patient had an excellent night and was in a much better condition in the morning although still gravely ill. Later on in his illness this patient became profoundly collapsed and completely incontinent of urine and fæces, and I was quite convinced that it was only the fact that sleep was promptly induced on his admission to hospital that enabled him—with the aid of intravenous saline infusions later on in his illness—to turn the corner and slowly regain his health.

As a result of a few similar experiences I came to make an absolute rule that every typhus fever patient must have sleep every night during the first six or seven days of his illness at least, even though opium derivatives had to be employed to attain that end.

For the relief of the very severe headache of typhus fever and of great cerebral excitement lumbar puncture was employed, and the results obtained in the majority of cases were satisfactory. The marked benefit obtained from lumbar puncture as an auxiliary measure in the treatment of typhus fever cases was noted by me more or less accidentally.

During the Spring of 1918 when typhus fever was prevalent, there was also a mild epidemic of cerebrospinal fever amongst Indian troops in and around Baghdad. Several cases which turned out to be typhus fever were sent to hospital with a diagnosis of cerebrospinal fever and vice versa.

One of these was Sepoy K.C., aged 27 years. He was sent to hospital with a diagnosis of cerebrospinal fever. Duration of illness—four days. On admission—semi-conscious and very restless; kept shouting about severe pain in the head; no rash; no squint; no herpes labialis; knee jerks absent; neck very rigid;

Kernig's sign markedly positive; and plantar reflex flexor.

Blood film report—no parasites seen, apparent leucocytosis.

Lumbar puncture performed—25 c.c. clear fluid under abnormally high tension removed. Cells scanty and mainly lymphocytes. No diplococci found (culture sterile). The clear fluid after an illness of four days' duration practically ruled out cerebrospinal meningitis. Typhus fever was diagnosed, and on the evening of the following day a typical typhus rash appeared.

The remarkable feature was, however, the immediate benefit derived from the withdrawal of the cerebrospinal fluid, as the patient ceased to shout and moan about his headache and became quiet and more sensible.

As a result of this experience I successfully employed this minor operation in a number of cases and found in it a most valuable means of alleviating the distressing headache.

The needle used should be very sharp and of a much smaller calibre than those usually offered for sale,—the majority of which are more suited to veterinary than to human medical practice. The utmost care should be taken not to allow the cerebrospinal fluid to escape rapidly after the stilette has been removed from the needle.

The most valuable therapeutic measure in typhus fever appears to be the administration of normal saline solution rectally, subcutaneously and intravenously.

As our experience increased saline therapy was employed more and more often. In mild cases rectal salines were alone employed, but in severe toxic cases we resorted to other methods.

The use of intravenous saline solution in typhus fever cases occurred to Captains Nicholson and Wiseman of our unit early in 1918.

The first occasion in which intravenous saline solution was administered to a typhus fever case in our unit was in the case of a European private soldier, aged 20. Delirium occurred very early in this case; the fifth day rash was very profuse, and despite the usual stimulating treatment and administration of rectal salines four-hourly, the patient's condition steadily deteriorated and he became completely incontinent of urine and faeces. On the ninth day of the disease the patient seemed to be hopelessly moribund. Two pints of normal saline solution were introduced intravenously and the patient rallied in an astonishing manner. Improvement was maintained throughout the tenth day; there was marked weakening on the eleventh day, but the patient rallied again after another intravenous saline infusion. In all, six intravenous infusions were given, and despite the apparently hopeless prognosis the patient recovered.

The recovery of this patient induced all the members of the hospital staff who had then, and subsequently, charge of typhus fever patients to employ this method of treatment, and the results in many cases were as striking as they were gratifying. Immediate marked improvement in the patient's condition was the rule. This improvement was frequently maintained after the first infusion in case of moderate severity, but in a number of very severe cases the operation was repeated several times.

In all cases normal saline solution was administered per rectum from the second or third day onwards so long as they were retained, and in a few cases subcutaneous salines were used after the first intravenous injection.

We did not introduce more than one pint at a time into the vein if there were more basal crepitations in the lungs than usual, and in certain patients of the more plethoric type it seemed to be good practice to remove a pint of venous blood before inserting the canula for the administration of the saline solution.

In the hot weather great care had to be taken to avoid the onset of hyperpyrexia by administering the saline solution at a temperature somewhat below normal blood heat.

These methods were warmly approved of by the senior consulting physician Colonel (now Sir) William Willcox, whose daily visits and repeated clinical demonstrations and instructions laid the whole hospital staff under a deep obligation, and as a result of his advocacy of it saline therapy was introduced into other units.

In a number of cases of typhus fever the patients complained of severe pains in the calves of the legs, and one or both of the lower limbs swelled considerably and became painful to the touch. This was specially apt to occur soon after the defervescence of the fever and was due to venous thrombosis.

All typhus fever patients were given Imperial drink in as large quantities as possible during the whole course of the disease with a view to lessening the tendency to thrombosis.

When venous thrombosis threatened I administered sodium citrate solution intravenously, as recommended by Marris (1917). Its action in all cases seemed to be beneficial, and no rigors or other ill effects were noted after the use of intravenous citrate.

The tendency to the occurrence of local thrombosis and sloughing is very marked in typhus fever, and the problem of the prevention of bed-sores is a very difficult one.

With the utmost care and with the use of air pillows and water beds for specially severe cases, it was found quite impossible to prevent

the occasional occurrence of bed-sores. When such sores do occur, every precaution must be taken to guard against septic infection with spreading cellulitis and gangrene.

No mention need be made of the nursing details usual in all fever cases—attention to the regularity of the bowels, careful watch for the occurrence of bladder distention, etc., but special attention should be paid to the toilet of the mouth, as sloughing parotitis is a common complication of badly-nursed typhus fever cases.

Specific serum therapy may be of value, but in isolated cases met with in India one is unlikely to be able readily to obtain serum from a convalescent patient, and Nicolle's serum for intrathecal and subcutaneous administration is as a rule unobtainable. My own experience of Nicolle's serum has not been encouraging, but it is probable that the serum at my disposal had lost a considerable part of its potency, and it would certainly seem to be worth while to try this serum if available.

In most textbooks no mention is made of the profound mental after-effects which, in my experience, are of not infrequent occurrence. Loss of memory, nerve deafness and deficient emotional control are quite commonly found after typhus fever.

In several European cases which I followed up for two years after their original attacks of typhus fever, defective memory and slight deafness were complained of; one medical man, writing twenty months after his original attack, said: "Distinction of sounds is not so good as before my illness, and I find it harder than formerly to catch the conversation of people. I find my memory gradually coming back, but I cannot continue at serious reading for such long periods as before."

Another medical officer wrote two and a half years after his original attack: "My memory is now quite reliable, but at first I suffered from lack of recognition of time and place. Later I used to forget dinner invitations and commit social blunders of that sort. I am still rather deaf."

In a number of the more severe cases which recovered, control of the emotions was markedly deficient up to the time of leaving hospital for evacuation to England or India, and a number of patients convalescent from typhus fever were in the habit of expressing like or dislike of their attendants and fellow convalescents in no uncertain terms.

One unfortunate European patient remained practically imbecile for three months, and when he left Baghdad after six months in hospital his mental powers were still very deficient.

It would appear, therefore, that "brain workers" convalescent from typhus fever should be urged to take a very long vacation and so far as Europeans are concerned, those

convalescent from typhus fever should be invalided to Europe for a period covering at least two hot weathers.

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CELLULAR ELEMENTS IN CHOLERA STOOLS AND THEIR RELATIVE IMPORTANCE IN DIAGNOSIS OF THE DISEASE.

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CHOLERA has been described as an acute infectious disease caused by Koch's *Vibrio cholerae* and characterised by a definite clinical syndrome. In the vast majority of cases as they appear to an ordinary observer it is not very difficult to recognise the cardinal symptoms of the disease, but to associate them with the presence of Koch's comma-vibrio is by no means an easy task. It requires a good deal of technical skill and previous experience to cultivate and isolate cholera vibrio successfully from the majority of cases. Nevertheless, in spite of all the experience and skill that is brought to bear on the investigation a comparatively large number of cases remain culturally "negative."

Is one justified in declaring that such cases are not suffering from cholera?

With a view to elucidating this point we have systematically studied for the last eight months 550 cholera cases, of all degrees of severity, admitted into the Campbell Hospital, Calcutta, and have analysed the different clinical, microscopical and cultural findings in order to determine a common and constant factor which would successfully lead to an early and easy diagnosis of practically all cholera cases—both mild and severe.

In our endeavour to find out this common factor, we first established all our cases in the present series on undisputed bacteriological evidence; we then worked out the percentage of cases which showed each of the following three features:—

1. Presence of comma-vibrio in the film preparation of the stool.
2. Presence of concentration of blood as shown by its specific gravity.
3. Presence of characteristic cellular elements in the stained film of the stool.

1. *Presence of Comma-Vibrio in the Film Preparation of the Stool.*—In ordinary text-books on tropical diseases this has been emphasised almost as a constant feature of the disease and vibrios are said to occur in large numbers in the rice-water stools. This view is also held by people in touch with the current literature on the subject. In a review of an article published by Goss (1923), the reviewer observes "this (absence of vibrio in the

where no vibrios were visible, but nevertheless they were cultivated successfully on special culture-media.

For microscopical examination, films were made from fresh samples by crushing a small fragment of mucus between two clear slides and then staining the air-dried film with dilute carbol-fuchsin. This procedure proved more accurate and reliable than the ordinary method of rubbing a small bit of mucus on the slide with a platinum loop. The results arrived at are given below.

| | |
|-----------------------------------|-----|
| Total number of cases examined .. | 495 |
| Comma-vibrios present in .. | 416 |
| Comma-vibrios absent in .. | 79 |

From the above it would appear that 84 per cent. of the cases investigated showed vibrios in the film.

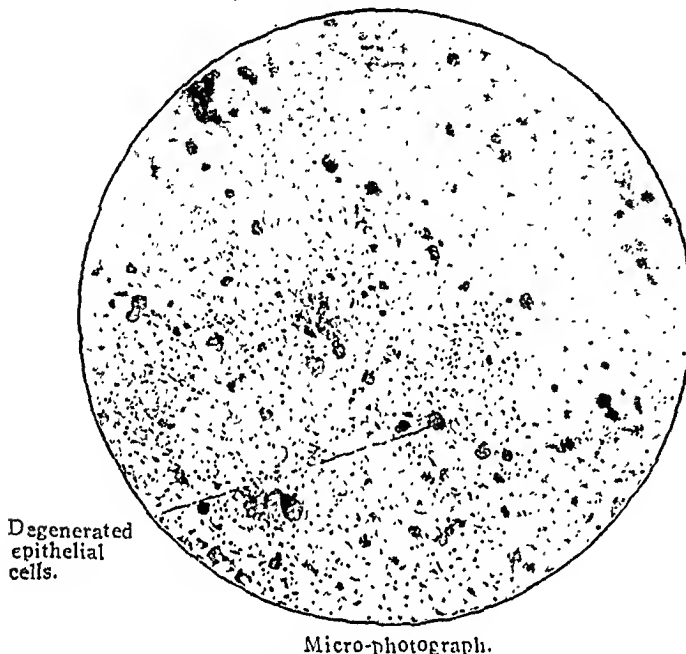
2. *Presence of Concentration of Blood as shown by its Specific Gravity.*—This was determined by the drop method as recommended by Rogers (1921).

| | |
|---|-----|
| Total number of cases examined .. | 496 |
| Number of cases showing the specific gravity to be 1,057 and upwards .. | 459 |
| Number of cases showing the specific gravity to be 1,055 and 1,056 .. | 29 |
| Number of cases showing the specific gravity to be 1,054 and below .. | 8 |

Thus a definite concentration of blood was noticed in 92 per cent. of the cases. About 6 per cent. of them were practically on the borderline, unless one was prepared to take Rogers' figure 1,054 as that representing the average specific gravity of Indian blood in health. Even then 2 per cent. of the cases failed to show any concentration. Besides, in a mild case where there is no failure of circulation and where absorption of fluid from the stomach is not hampered, this is apt to be a very inconstant feature, and much reliance cannot be put upon it as it indicates only loss of fluid which may occur in other intestinal diseases such as dysentery and ptomaine poisoning.

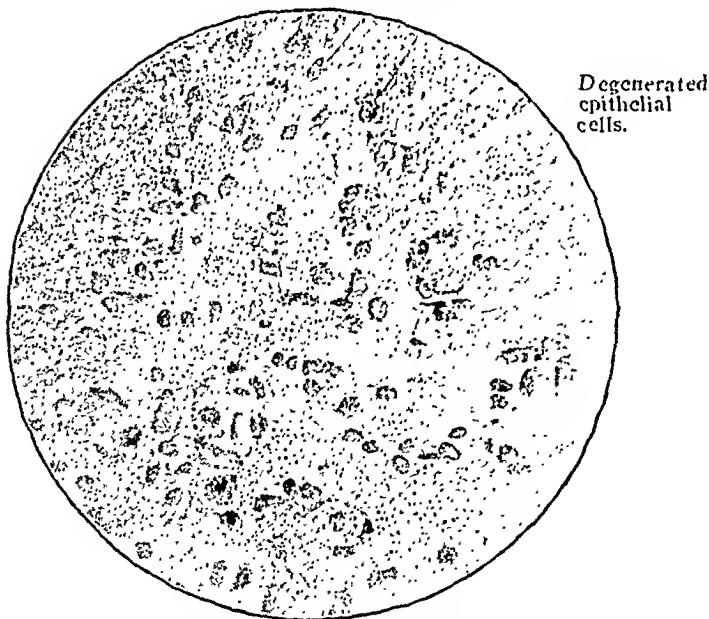
3. *Presence of Characteristic Cellular Elements in the Stained Film of the Stool.*—Cytological elements in the stool have furnished important clues in the diagnosis of such diseases as amebic and bacillary dysenteries. In cholera where the disease runs a very acute course and toxins of the comma-vibrio exert a specific action on the epithelial cells of the small intestine leading to their necrosis, desquamation and evacuation with the stools, a faithful picture of the morbid changes is obtainable throughout the whole course of the disease. And this can be very easily brought about by merely staining a thin film of the stool made from a small bit of mucus, according to the procedure described under sub-heading No. 1. The cells are usually the altered epithelial cells of the small intestine with badly-stained, nuclei and very little protoplasm

PLATE I.



Degenerated epithelial cells.

Micro-photograph.



Degenerated epithelial cells.

Smear preparation of cholera stool showing degenerated epithelial cells.

small intestine) is such an unusual condition since the stools of cholera patients generally swarm with vibrios." Our experience, however, is not in accord with that of the reviewer or of the text-book writers. During our investigation we often came across cases in the acute stage

round them. They may be few in number but are invariably present. Polynuclear cells are, as a rule, absent (*vide plate*).

| | |
|-----------------------------------|-----|
| Total number of cases examined .. | 367 |
| Characteristic cells present .. | 359 |
| Characteristic cells absent .. | 8 |

They were present in 98 per cent. of the cases. Where they could not be seen they were either obscured by faecal debris or were disintegrated by putrefactive bacteria in a stale specimen.

CONCLUSIONS.

1. In a total of 495 cholera cases diagnosed bacteriologically comma-vibrios were found microscopically in 84 per cent. of the stool films.
2. In a total of 496 cholera cases 92 per cent. showed definite concentration of blood. In 6 per cent. of them the concentration was indefinite and in 2 per cent. there was no concentration at all.
3. Cytological elements in the cholera stool are constant and characteristic and can be utilised as a reliable index in 98 per cent. of cases.

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A NOTE ON THE CULTIVATION OF AN ENTAMOEBA FROM A MONKEY (*MACACUS RHESUS*).

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On the 9th May, 1925, a monkey which was experimentally infected with *Trypanosoma evansi* in the laboratory, died. The post-mortem was done within four hours of death.

On careful examination of the contents of the cæcum for intestinal protozoa very scanty, sluggishly motile entamoebæ were seen. There was no evidence of ulceration in the cæcum or in any other part of the large gut.

Four sets of culture were made in the following media:—

1. Human blood agar slant, two-thirds of the slant being covered with Locke's solution containing egg albumen in the proportion of one egg to 1 litre.
2. Ordinary nutrient agar slant + defibrinated rabbit's blood put at the bottom of the tube, covered with Locke's solution containing rabbit's serum diluted 1 in 10.
3. Locke's solution + human serum diluted 1 in 8.
4. Row's hæmoglobin medium.

The cultures were incubated at 37°C. for 24 hours. The first two culture tubes showed a few very active entamoebæ containing numerous ingested bacteria. In the fresh state the nucleus was not visible nor could the difference between the ecto and endoplasm be made out.

In an iodine preparation, however, the ring nucleus typical of the genus entamoeba was easily seen. There was no growth in the culture tubes 3 and 4. A better growth was obtained after 48 hours' incubation and some of the entamoebæ in tube 2 were found to contain red blood corpuscles.

Examined on the fourth day the culture showed no entamoebæ (vegetative or encysted) even after prolonged search, there being a heavy growth of bacteria, yeasts and blastocystis.

As the parasites died out so soon a systematic study of their cytological characters was not possible nor could their pathogenicity be tested. However, from the characters noted above, i.e., (i) motility, (ii) character of ecto and endoplasm, (iii) character of nucleus, and (iv) ingestion of red blood corpuscles, I am of opinion that the entamoeba cultivated was *E. mitalli* (Castellani).

It will not be out of place to mention here that the writer, whilst working with Major R. Knowles, I.M.S., has cultivated *Entamoeba histolytica* both from kittens experimentally infected with this entamoeba as well as from the stool of a human case of amoebic dysentery with marked success, using the technique of Boeck and Drbohlár. The kitten and human strains were kept going up to the 32nd and 13th day, respectively, by repeated subinoculation at intervals of 24 or 48 hours.

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A Mirror of Hospital Practice.

NOTES ON TWO CASES OF ENCEPHALITIS HÆMORRHAGICA AFTER NOVARSENOBILLON ADMINISTRATION.

By Capt. K. SEN, M.B., Chittagong.

Case No. 1.—Died. R. R. C., aged about 27 years. Onset; on the third afternoon after his second injection of novarsenobillon (dose reported to have been 0.6 gm.), the patient felt unwell and feverish, with severe headache. He went to see his medical attendant, who was away from town. He came back, took some quinine and his usual meal and retired to bed early. At night his headache was intense with high fever (temperature not taken), his speech incoherent and he was delirious. In the early hours of the morning he had epileptiform convulsions and rapidly passed into a state of unconsciousness. The jaws were tightly locked and he passed urine involuntarily.

When I saw him in the morning he was unconscious with temperature 102°F., pulse 120,

respiration rate 40 per minute; blood pressure high; tremor in the muscles of the upper and lower extremities; the jaws alternately locked and relaxed; the deep reflexes absent; the eyes staring; conjunctivæ intensely congested; the pupils contracted and but sluggishly reacting to light. The urine shewed albumin in moderately large amounts.

Treatment.—Rectal enemata were given, together with chloral and bromides rectally every six hours. An icebag was applied to the head and nape of the neck. Lumbar puncture was advised but was strongly objected to by the relatives, as also was venesection. In the afternoon the patient's condition was much the same; temperature 99.8°F., pulse 90, respiration 24. In the evening a *kaviraj* was called in, and he died at about the 32nd hour after the onset of symptoms.

Case No. 2.—Recovered. A. K. P. of Baraidala, aged 30 years. On the fourth afternoon after his second injection (dose reported to have been 0.6 gm.), was taken ill. His symptoms were practically identical with those of the first case, but there was no fever; temperature 98.6°F., pulse 108 and of low tension, respiration rate 42, with Cheyne-Stokes breathing.

Treatment was as in the first case, the relatives having refused lumbar puncture and venesection. He recovered partial consciousness in four days and was fully conscious in ten days.

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A CASE OF RIGHT-SIDED PLEURAL EFFUSION EXTENDING INTO THE EPIGASTRIUM.

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A MAHOMEDAN woman, aged 26 years, married, was admitted to the Jamshedpur (Tata's) hospital on 15th February, 1925, complaining of severe pain and a swelling in the upper part of the abdomen, with difficulty in breathing and severe paroxysmal dry cough. The cough began after the onset of the pain. She could not say definitely whether the pain or the swelling began first.

Previous History.—She says she never had any chest or abdominal trouble previous to this. She was leading a healthy life up to the onset of the present illness. She has had no children and there was no menstrual trouble, her periods having been regular. She had no venereal disease, neither had her husband had any to the best of her knowledge.

Present Condition.—She looked rather thin and anæmic. The conjunctivæ were pale and there was no jaundice. The face looked anxious

and there was dyspnoea. Her sleep was disturbed owing to the severe pain in the epigastrium. The pulse was 120 and of low tension. Respiration was difficult and 32. The temperature was subnormal (96°F.). On inspection the chest looked more full on the right side and its mobility was impaired. There was no œdema of the chest wall. On percussion the right side of the chest was woody dull from below the clavicle right down to the costal arch.

On auscultation, the breath sounds were markedly diminished and ægophony was heard at the upper part of the right chest.

Heart.—The apex beat was outside the left nipple line, otherwise the heart was normal.

Abdomen.—There was a round, soft swelling of cystic type of the size of a small bael fruit in the epigastric region. It was ill-defined and dull, and the dullness merged into that of the right side of the chest. No thrill could be elicited over the tumour. It was tender and painful. Over the tumour there were marks of the counter-irritation which these Indian women employ for the relief of pain. The spleen was enlarged. The liver margin could not be felt owing to the pain, but the abdomen was tender along the costal margin on the right side of the tumour. The abdomen was normal elsewhere. The bowels were constipated, not having moved for the last three days. The urine was normal, no albumen being found, but the quantity of urine, according to her statement, was diminished.

The blood was not examined and an x-ray photograph could not be taken owing to lack of apparatus.

Diagnosis.—There was no doubt about the collection of fluid in the right side of the chest. The difficulty in diagnosis was the nature of the lump in the epigastric region. It might have been a hydatid cyst, an enlarged gall bladder, a subphrenic abscess, a cyst of the lesser omentum, or a pancreatic cyst. As she had great dyspnoea which was to a great extent due to the collection of fluid in the pleural cavity it was decided to aspirate her first. This was done on 16th February, 1925. Two pints of straw-coloured serous fluid came out. During aspiration it seemed that the swelling in the epigastric region went down a little. She then immediately began to cough violently and the cannula was withdrawn. After aspiration she seemed a little better, the dyspnoea also seemed less. The next day she felt better and said the cough was less, but the epigastric swelling looked just as big as before the aspiration. This apparent diminution of the swelling during aspiration gave me the clue that the swelling in the epigastrium might be an extension of the contained fluid within the pleural sac. On 20th February, 1925, she was again aspirated and three pints of fluid were taken out, and with this the epigastric swelling went down markedly to a great extent and she felt very much better.

Next day the swelling was entirely gone and with it the pain and tenderness as well. From this time onwards she felt better every day and was discharged on 2nd March, 1925.

Remarks.—The interest of the case lies in the fact that the patient came to hospital for the relief of pain and swelling in the *epigastric* region. During physical examination effusion was detected in the right side of the chest and hence it was aspirated. It never struck me that the swelling in the epigastric region had any connection with the pleural effusion. It must have made its way through the diaphragm where it is deficient in muscular tissue, by the side of the ensiform cartilage. The pain was probably due to some pleuritis and local peritonitis.

My thanks are due to my assistants, Drs. K. B. Chatterjee and S. N. Sen, for compiling these notes for me.

A CASE OF CHOLERAIC DYSENTERY.

By P. K. KURUP, L.M.P., Naduvannur, Malabar.

The patient, a male, aged 22, Abbagi by name, was admitted into the emergency ward of the L. F. Dispensary, Avanashi, Coimbatore district, at 7-45 A.M. on 14th November, 1923, with dysentery and vomiting.

He belonged to a place 7 miles off and he had no relatives to take care of him. He was a tailor and a fellow tailor brought him to my dispensary for treatment. On admission the patient appeared to be a typical case of cholera. The cheeks were hollowed with prominent zygoma, the nose pinched and the eyes sunken and the skin of the fingers shrivelled. He was passing profuse and red-coloured watery stools. There was complete suppression of urine. The respiration was rapid. He could not talk but could only whisper. The pulse was scarcely perceptible. The temperature was sub-normal, 94°F. He was restless and tossing about, complaining of intense thirst in a whispering manner and making signs for water. He whispered and showed with his hands that he had some pain in the chest.

To my mind the case appeared to be a typical one of cholera in the "algid stage," but the colour of the stools was evidence strongly against this diagnosis, though blood may be found in the stools of cholera patients at a certain stage in some cases.

I treated him for collapse. Potassium permanganate solution and pills (2 gr.) every 15 minutes for two hours were given and afterwards the pills were repeated every half an hour. Chlorodyne and Mistura Pro-diarrhoea to promote the reaction were used. By 11 A.M. the patient became a little better and his pulse improved; and the number of motions was less. Towards evening, he had 4 motions which were very small, containing blood and slime. I suspected some poisoning in the beginning, but ex-

cluded that since he gave strong negative evidence. I suspected poisoning by *kalli* fruit which the people of those parts eat very indiscriminately. But even that was excluded by his history. The only history was that he was suddenly attacked with purging and vomiting at 10 A.M. on 13th November, 1923.

Some ten days prior to the incident the place whence the patient came, was declared to be infected with cholera and there were three cases.

The patient was given strychnine injections and saline and atropine, but to no avail. By evening the patient said that he felt better but I did not find any improvement in his condition. He died at about 12 P.M. on 14th November, 1923.

One peculiar phenomenon, I observed throughout the patient's illness, was that both his eyes were much injected from the beginning to the end. A post-mortem on the body of the deceased was not available. I diagnosed the case as "Choleraic dysentery."

[*Note.*—Possibly a fulminating case of Shiga bacillus infection.—Editor, I. M. G.]

A CASE FOR DIAGNOSIS.

By N. CHATTERJEE, M.B.,
Domjore, District Howrah.

I WAS called in to see a patient in the middle of the night, with the following symptoms:—

Pain all over the body; retention of urine, flatus and faeces for 36 hours; but no fever.

On the 5th March, 1925, he had come down from Calcutta and began to have vomiting and pain in the umbilical region. He was treated by a local doctor and the vomiting ceased, but the pain continued and settled in the left side. The patient was a boy of some 15 years, with an anxious look, but fully conscious; respiration was of thoracic type; the abdomen soft but distended; there was no fever; the pulse rate was 105, and the respiration rate 45. There was marked tenderness in the hypogastrium and left inguinal region and a tympanitic note on percussion of the abdomen. Intestinal peristalsis was not in evidence.

A soft rubber catheter was passed, but only a few drops of urine were evacuated, whilst a soap and water enema was without result. There appeared to be nothing wrong with the heart, and the patient was kept under observation till the next morning.

The condition then was still the same, except that the pulse rate was now 115, but there was still no fever. The relatives refused to have the patient removed to hospital. Eight hours later he developed subdermal hæmorrhages under the skin of both legs and the abdomen, and died some ten hours later. There was no fever throughout and no prodromal rash. He was vaccinated a year previously.

AN INTERESTING CASE OF DIABETES IN COMBINATION WITH A CONDITION OF LOW KIDNEY-THRESHOLD.

By Dr. P. V. GHARPURE, M.D. (Bom.),

Grant Medical College Bombay.

MR. G. N. K., an adult male, aged 40, a strict vegetarian and gymnast by profession, had suffered from (?) syphilis and gonorrhœa about 8 years ago, and had been treated for both on modern lines. He suffered from increased appetite, thirst and progressive weakness during the past few years, and for these complaints he consulted me.

Having found sugar in his urine on my first seeing him, I got him admitted into hospital for insulin treatment.

The results of my investigation are as follows:—

5th February, 1925.—The patient was allowed his usual diet and a 24 hours' sample of his urine showed the sugar to be 7.25 per cent.

6th February, 1925.—Six hours after his principal meal his blood-sugar was estimated; it was found to be above 0.30 per cent. and his urine showed sugar. This estimation was carried out only as a preliminary step.

7th February, 1925.—Complete starvation. (He was allowed only water.) At the end of 24 hours his urine became sugar-free, but he began to feel uneasy, began to get headache, sudden weakness and hunger, which meant hypoglycemia. I allowed him a small quantity of boiled rice and he felt relieved. The urine voided at night showed a trace of sugar. Starvation was continued.

9th February, 1925.—Sugar tolerance test:—

Blood-sugar estimation—McLean's method.

9.25 a.m. 0.86 per cent.

The urine was sugar-free. Immediately after taking the blood he was given 50 gms. of glucose.

| | | |
|------------|----|-----------------|
| 9.55 a.m. | .. | 0.100 per cent. |
| 10.25 a.m. | .. | 0.112 per cent. |
| 10.55 a.m. | .. | 0.112 per cent. |
| 11.25 a.m. | .. | 0.112 per cent. |
| 11.55 a.m. | .. | 0.118 per cent. |
| 12.25 p.m. | .. | 0.118 per cent. |
| 12.55 p.m. | .. | 0.118 per cent. |

At this stage his urine showed sugar.

From this date onwards he was allowed full diet, as I thought that his glycosuria was due to his renal failure, all the same suspecting diabetes.

22nd February, 1925.—12.30 (one hour after food) 0.231 per cent.

Urine showed sugar.

2 p.m. (2½ hours after food) 0.225 per cent.

As the blood-sugar was keeping high for such a long time no further estimation was done.

Evidently the percentage of blood-sugar above the kidney-threshold and its maintenance at a height for nearly 3 hours shewed the case to be one of confirmed diabetes.

CONCLUSIONS.

1. The patient is a diabetic, and has a lowered kidney-threshold.

2. His mechanism of keeping blood-sugar at about normal is faulty.

3. His blood-sugar falls below normal too rapidly by starvation and he actually shows signs of hypoglycemia.

4. It is not possible to say how far a dose of insulin before his meal would reduce his blood-sugar, and I thought it might prove harmful to test it.

5. The case appeared to me to be unfit for insulin.

6. No reference to such a case with some guide to deal with it could be found.

A CASE OF KALA-AZAR WITH TRANSPOSITION OF THE VISCERA.

By K. N. CHATTERJEE, M.B.,

Chinsura, Howrah District.

A VERY advanced case of kala-azar is under my treatment. The patient is a Bengali male child, aged about 8 years, and is an inhabitant of the Howrah District. His blood was examined by a specialist, and several injections were given to him, including "urea-stibamine," but no appreciable improvement took place.

The first day when I tried to palpate the boy's liver, I was surprised not to find the organ in its place, but felt instead the shape and consistency of a huge spleen hanging directly from beneath the right costal arch and extending below as far as the right iliac fossa. I then began to search for the liver and found the organ was lying on the left side, as far as the middle line, entirely occupying the left hypogastric region, and extending below as far as the umbilicus. The soft and sharp margin of the organ together with the notch between the two lobes were very distinctly felt. The position of the stomach could not be ascertained owing to the entire upper abdomen being covered by the enormous liver and spleen. The heart was also on the right side.

The case was shown to Lieutenant-Colonel D. Basu, I.M.S. (retd.), who confirmed my findings.

The patient's father is dead, but neither his mother nor any other known member of the family has transposed viscera.

The child is now well on the way to recovery after further injections of sodium antimonyl tartrate.

Indian Medical Gazette.

JULY.

THE BENGAL AYURVEDIC AND UNANI COMMITTEES.

AN ANTICIPATION OF THEIR REPORTS.

MORE than three years ago, two Committees were appointed by the Government of Bengal to "consider and report what practical steps can be taken for the restoration and development of the Ayurvedic and Unani systems of treatment with special reference to the question of teaching these systems under proper supervision and control."

We understand that the reports of these Committees are already in the hands of the Government of Bengal and may shortly be published.

Each of the two Committees was composed of:—(a) several practitioners of the system of medicine which was under consideration; (b) several practitioners of scientific medicine; and (c) some representative laymen. We hope shortly to be able to comment on the reports themselves, but in view of the interest of the subject we have asked ourselves what kind of reports might have been expected to emanate from the two Committees?

The following is an attempt to answer the question, but we may as well admit at once that the anticipation which we produce is widely different from the reality. None the less here is what we should have expected each of the reports to be like.

REPORT.

The Committee at the very first meeting discovered that it was impossible to expect that any report could be submitted which would comply with the terms of reference as laid down by Government. The points of view of the various sections of the Committee are briefly stated for the information of Government.

NOTE BY THE PRACTITIONERS OF THE ANCIENT SYSTEMS.

The Ayurvedic (or Unani as the case may be) practitioners and members of the Committee are conscious of the good intentions of Government in taking steps to encourage the ancient systems of medicine and are duly grateful for this expression of sympathy, but they cannot fail to record their opinion that an unintentional slight has been cast on the practitioners of the system.

With all respect to Government, we must point out that the followers of the Allopathic system, who have been appointed to the Committee, have no intimate knowledge of our systems and, however well-intentioned they may be towards that

system they cannot be possessed of the qualifications which are essential for working out a scheme for its restoration.

Even in the improbable event of their learning enough of our system in a short time to enable them to co-operate with us in an intelligent manner in preparing a united report, we feel that any report which might be agreed on by by them and us would be looked on with natural suspicion and mistrust by the main body of the practitioners of our system.

For this reason it is not likely that such unanimity would prevail among the practitioners of the system that Government would be justified in taking action on the report.

We beg also to point out that although some of us admit that our system might derive benefit by adopting some of the methods which are in use among Allopathic practitioners, the majority of our practitioners regard our system as complete and self-sufficient so that they would resent the suggestion that it can be restored and improved by the help of Allopathic medical men. Had Government been pleased to appoint a Committee consisting of representative practitioners of our ancient system, we should have been glad to show how best the system could be encouraged and fostered so that it might take its proper place as the national and official system of the Province. After years of official neglect and discouragement our system is still accepted by large numbers of the population, and the fact that it is still so popular in spite of all difficulties is enough to show that it would be capable of supplying the needs of the people if it were accorded the same degree of recognition and support as the official system.

We would recommend to Government the adoption of the policy which has been followed by the Government of the United Provinces, in which a Committee consisting of practitioners of the indigenous system and of laymen who are sympathetic to the system has been appointed to recommend steps for the improvement of the Unani or Tibbi system.

NOTE BY THE PRACTITIONERS OF SCIENTIFIC MEDICINE.

After an amicable exchange of views with the Ayurvedic (or Unani) medical members of the Committee we are forced to agree with them that no good results can follow from an attempt to comply with the terms of reference of Government. The note submitted by the practitioners of the ancient system states the reasons for this opinion.

We desire, however, to place before Government some points for their consideration.

(1) We think that the first thing to be considered is whether it is desirable for Government to take steps for the restoration and improvement of the ancient systems.

(2) The development of various systems of medicine in the world generally has been a natural

one and has not resulted from the action of governments.

All governments have made use of the knowledge that has been acquired by medical men for the protection of the health of the people and so public health departments have sprung up. Some governments, notably the Government of India, have given state aid, to medical relief, medical education, and medical research, and these governments have adopted scientific medicine as the system which has received official recognition and support.

(3) The action of the Government of India in subsidizing scientific medicine has not resulted from racial, national or religious prejudice. Every progressive country in the world has adopted scientific medicine rather than the traditional systems of the country, because all the educated classes of each country have by common consent regarded scientific medicine as the only system which is capable of meeting the needs of the people.

We may point out that the East Indian Company believed that the best way of bringing medical relief to India was by adopting the prevailing indigenous system: the attempt to develop the indigenous systems was a failure, because the educated classes turned to scientific medicine, and the foundation of the Calcutta Medical College was the natural result of the inclinations of the Indian community.

(4) We must protest against the appellation "Allopathic practitioners." We do not adhere to any traditions whatever; our system of medicine is not "Allopathic," it is not "European," it is not "Western," it is not perfect nor self-sufficient. It represents the stage of progress that has been reached by scientific workers in every progressive country of the world. While it is not completely scientific, as our knowledge is far from perfect, it deserves the name of "International Scientific Medicine" in that its aim is scientific accuracy and completeness, and in that it is entirely free from national or local prejudices of any kind.

It is a popular fallacy that scientific medicine is one of several systems which are competing for the suffrages of the people; we admit that some practitioners call themselves Allopathic physicians and suggest to the people that their system is complete and all-sufficing, in the same way as many Ayurvedic and Unani physicians claim that their systems are complete and superior to all others.

The true follower of scientific medicine admits his fallibility and imperfection and for this reason he commands the respect and confidence of the educated community.

He justly claims that scientific medicine is the only true system, because it accepts and employs everything that has been shown to be useful, from whatever source it be derived. He holds that all other systems are doomed to final extinction in India and in every country of the world

for the very reason that they claim to be self-sufficient and complete. When they cease to make this claim and when they recognise that the only true system is that which takes everything that is best from every source, they will automatically become merged in scientific medicine. It would, therefore, appear to be a retrograde step to attempt to restore any traditional system of medicine.

(5) We admit that our knowledge of the ancient systems is not sufficient to justify us in pronouncing judgment on them in detail: the systems may have valuable items of knowledge which we have hitherto failed to secure, for this reason we would recommend to Government the institution of an enquiry into the various ancient systems, with a view to the publication of those methods of diagnosis and treatment which are claimed to have special value and which may not be available to the world at present.

A study of the ancient books and of any modern text-books which give an account of the methods employed by practitioners of the system will be of great interest and will form a necessary prelude to the state recognition of the systems.

We cannot recommend the formation of schools or colleges which will teach matters of which we are ignorant. Our system is universally accepted all the world over, it has been clearly and fully published for all to read and to judge. No system should receive state aid and recognition until it has been examined. We, therefore, suggest that the practitioners of the ancient systems should be given the fullest facilities for stating their case. Let them select representatives, who will be subsidized by Government, for the production of a clear and intelligible account of the valuable features of their systems and who will show reasons why it is in the public interest to restore the ancient systems. They should be asked to prepare a scheme by which public health and medical relief can be promoted on lines which are not now available to international medicine as practised by medical men and public health workers all over the civilized world.

If, for political reasons, Government should decide to inaugurate schools of teaching of the ancient systems, without reference to the inherent desirability of such a step, we would respectfully beg to be excused from taking any part in the organization of these schools. If we were to meddle in the affairs of the indigenous systems our action would give rise to suspicion and mistrust. We should be suspected of an insidious attempt to proselytize the practitioners of the ancient systems, and our action would not command the support of scientific medical men.

NOTE BY THE LAY MEMBERS OF THE
COMMITTEES.

We regret that we are not in a position to pass judgment on the views expressed by our medical colleagues.

We have great sympathy with the aspirations of the practitioners of the ancient systems of medicine, but in view of the statements made by the practitioners of scientific medicine, we feel that Government would act wisely in adopting their suggestion that facilities should be afforded to the practitioners of the ancient systems to give clear expositions of their causes.

The public will then be in a position to judge whether the claim for the restoration and teaching of the ancient systems is justified and whether its acceptance is in the interests of the people.

It may be that there is something in each of the ancient systems which makes it specially suited to the climatic and individual constitutional conditions which prevail in India.

If so it is important that we should be in possession of the facts. Great claims have been made by the practitioners of the ancient systems, indeed, these are much greater than those made by scientific medical men. On the other hand we cannot ignore the fact that scientific medicine has been accepted by the great majority of the intelligent and educated classes in every country in the world, and, therefore, we feel that we cannot accept the claims of the practitioners of the ancient systems without full investigation.

Such is the report that might have been expected from each of the Committees, we shall shortly see to what extent it corresponds with the actual reports which have been presented to Government.

SPECIAL ARTICLES.

"THE MEDICAL ASPECTS OF CHEMICAL WARFARE."*

It is pretty certain that there will be a "next war," and it is equally certain that it will be fought with gas, unless some other and more effective form of frightfulness has been discovered in the meantime. Hence the importance of this very complete, authoritative and wonderfully-illustrated exposition of the subject. In brief, the book is one which is essential to all military medical officers. Whatever may be the popular belief as to the barbarousness of using gas, it has come to stay; indeed it may be the decisive weapon of future wars. Colonel Vedder claims that gas can be made far more humane than rifle or artillery fire, and the terrible photograph on p. xii of his preface—showing complete destruction of the face from a bullet wound, without death having ensued—certainly goes far to support his contention. Also gas is often far more efficacious than artillery: in the first German gas attack at Ypres on April 22nd, 1915,—of which a very striking aeroplane photograph is given in the frontispiece,—180 tons of chlorine were liberated on a front of 6 kilometres: the gas attack lasted for five minutes; the British lost 5,000 killed and many times that number of casualties: had the Germans known it, they could have walked through

to the Channel ports. In the next war it is quite likely that entire cities may be wiped out by intensive gas attacks from the air. At the Hague Congress of 1899 all the powers present (except the U. S. A.) pledged themselves not to use poisonous or suffocating gases; the Germans not only violated this pledge in 1915, they committed the even greater crime of using their new weapon foolishly; to-day sees every first-class military power absorbed in the study of the gas problem.

Following an introductory chapter on the history of chemical warfare, come chapters which deal fully with the physics and elementary chemistry of the subject, the very important subject of meteorology in relation to it being next discussed.

Turning first to smoke clouds, two types are in use: (1) screening smokes which interfere with visibility; and (2) toxic smokes which are poisonous or irritant. If a large volume of smoke is emitted from a single source, it spreads in a cone-shaped manner, and continues to spread at a uniform rate for a considerable distance, the angle of spread being from 10° to 15° on each side of the axis of the wind. Wind velocities of 10 to 12 miles an hour are those most suitable for the use of gases and smoke. As the air close to the ground moves more slowly than the air above it, the upper surface of the cloud is blown forward faster than its lower surface, and hence the weight of such a cloud is limited. Humidity is of importance; thus phosgene and lewisite are hydrolysed by heavy rain, whereas mustard gas is hardly affected.

The chief types of gas used during the war were:—

(1) pulmonary irritants, such as chlorine, phosgene and chlorpicrin; (2) vesicants, such as mustard gas; (3) lachrymators, such as chlor-aceto-phenone and brom-benzy-cyanide; (4) irritants causing sneezing and irritation of mucous membranes; (5) direct poisons, such as hydrocyanic acid; and finally (6) gases which act by interfering with the respiratory properties of the blood.

Turning to the pulmonary irritants, chlorine is now of only historical interest. It was the first gas used by the Germans, but can be easily guarded against. Even at a 1 in 10,000 dilution it brings on coughing and a sense of suffocation. Death occurs either immediately, or within 24 hours, and the post-mortem findings are acute tracheitis and bronchitis with sloughing of the mucous membranes; acute congestion and œdema of the entire respiratory tract, acute dilatation of the heart, and passive congestion of the abdominal viscera. Apparent improvement may be followed by septic infection and death from broncho-pneumonia. Phosgene — CO Cl_2 — is far less irritant and far more deadly. Even in high concentrations, the patients may shew no early signs of irritation: thus field hospital patients may leave their beds to visit the latrine, and a moment after returning may be taken ill with progressive and fatal dyspnoea. A good example is that of a chemist accidentally gassed with phosgene in a laboratory at 1 p.m. Until 5 p.m. he was quite comfortable and free from symptoms: coughing commenced at 5-30 p.m. and he died at 6-50 p.m. Progressive pulmonary œdema is the dominant symptom, and patients may die in blue asphyxia with cough and rapid respiration, or in grey asphyxia with but little cough or expectoration, shallow rapid respiration, and heart failure. Most of the fatal cases die within 24 hours of being gassed; very few die after the third day. The acute œdema of the lungs is due to local injury to the alveolar capillaries, and as the œdema fluid is derived from the blood, there is great thickening of the blood, the erythrocyte count rising as high as 9,000,000 per c.mm. Anoxemia is marked, and all the conditions present overload the right side of the heart.

Chlorpicrin is more irritant than phosgene,—lachrymation being the first warning of its use, followed by nausea and vomiting. The patient appears to age rapidly and there may be acute nephritis. The bronchial damage is less severe than with chlorine, but there is extreme œdema and congestion of the lungs.

* "The Medical Aspects of Chemical Warfare," by Lieut.-Col. E. B. Vedder, M.C., U. S. A. Baltimore: Williams & Wilkins Co., 1925. English Agents: Baillière, Tindall & Cox, London. Demy 8vo., pp. 327 plus xvi; 52 illustrations. Price 32s. 6d.

In the treatment of gassing from pulmonary irritants, diagnosis is the first difficulty, especially with phosgene cases: 24 hours' observation or less, however, will soon shew whether the patient has been gassed or not. The clothing should be loosened and the patient kept absolutely at rest. In hospital venesection and the administration of oxygen are the chief lines of treatment. At the height of the attack from 500 to 700 c.c. of blood may have to be withdrawn. Injections of urease, a ferment which acts on the blood, liberating ammonia which will neutralise the acid effects of the irritant gas are also useful; 1 c.c. of a 10 per cent. solution being given intravenously per 10 kilos. or in all about 7 c.c. for a man of average weight. Emetine subcutaneously also serves to reduce the pulmonary oedema. In phosgene poisoning intravenous injection of a solution composed of 25 per cent. gum arabic with 25 per cent. glucose combats the concentration of the blood. Oxygen must be administered, best through a nasal catheter, continuously and over a long period. Cardiac stimulants and fluids freely to relieve thirst are also indicated. Patients who have recovered from the acute pulmonary oedema must be carefully watched and nursed to prevent secondary septic pneumonia. Of 4,575 cases gassed with irritant gases, the average stay in hospital was six weeks, and most of the patients were able to return to duty in from ten to nineteen weeks. In a very small proportion of cases the gassed individual becomes unfit; such cases being grouped as cases with symptoms of irritable heart, cases with nocturnal spasmodic dyspnoea, and cases of mixed type. Graduated exercises are the best line for the first group, and oxygen treatment for the second.

Turning to the vesicant gases, mustard gas—yperite or yellow cross—was the first to be used against the British. It is a heavy oily liquid, was used in shells, and is ten times as lethal as chlorine. It was the most effective chemical agent used during the war and produced more casualties than did any other type of gas. Among the British gas casualties in France it is estimated that 80 per cent. were due to yellow cross shells (mustard), 10 per cent. to blue cross shell (arsenicals), and 10 per cent. to green cross shell (pulmonary irritants). Mustard is toxic in concentrations which cannot be detected by the sense of smell; it is a heavy and persistent gas, and breaks down morale, since men do not know with certainty that they can eat, drink, sleep or even sit down with certainty. In a severe case dying within 48 hours, burns of all degrees from erythema to extreme blistering may be found on various parts of the body as the gas readily penetrates clothing. There is advanced conjunctivitis, the pharynx and posterior third of the tongue are oedematous and may shew necrosis. The trachea and bronchi are lined with diphtheritic casts, and the lungs engorged. Clinically we have mild cases with chronic irritation of the airways and lungs,—some of which may develop severe general reaction, septic involvement of the lungs and may end fatally; intermediate cases with extensive burns, aphonia, severe abdominal colic, continuous cough and acute conjunctivitis and nasal catarrh, with fever; and severe cases with severe ulceration and disturbance of the central nervous system. Different individuals shew the most surprising difference in reaction to mustard gas; slight exposure will lay one man out prostrate with oedema, itching, and cough; whilst a second exposed to the same concentration may shew no symptoms. A sensitivity test to the skin can be relied upon to eliminate the former class, which forms some 2 per cent. or less; whilst at least 25 per cent. of men are very resistant.

In the first aid treatment of mustard poisoning, the first step is to remove the gas from the skin, which it penetrates very rapidly. Soap and water are not very effective; but sponging the exposed parts with kerosene on a clean cloth for 30 minutes is very efficient, followed by green soap and hot water. If these solvents are not available, aqueous chloride of lime solution or Dakin's solution should be used. Immediately on ad-

mission to hospital, all clothes should be removed, and the patients should pass through a shower bath before admission to the ward,—otherwise they may carry mustard with them into the ward. Particular attention must be paid to the hair, which becomes saturated with the gas. The acute conjunctivitis must be treated with the usual measures, and local application of pure liquid paraffin is soothing and protective. The nasal and pharyngeal mucosae must be thoroughly cleansed with bicarbonate solution; whilst menthol inhalations from steam,—menthol 10 grs., tinct. benzoinæ co. 30 c.c. with hot water—are very useful. In order to, prevent septic infection of the denuded bronchi a mask must be applied with menthol, chloroform, eucalyptus, etc. The skin must receive continuous and thorough treatment; ointments are useless but Dakin's solution, a surgical vanishing cream containing chloramine-T, and warm bicarbonate baths are useful measures. Benzyl alcohol, 100 parts; ethyl alcohol, 96 parts, with glycerine 4 parts is a useful lotion to relieve itching.

Lewisite was a gas introduced in 1918, but not actually used during the war. It is chlor-vinyl-dichlor-arsine, and is a heavy, oily liquid. It is a stronger vesicant than mustard and also a powerful respiratory irritant, and may possibly be employed in the form of liquid sprays from aeroplanes. With regard to treatment, fortunately the gas is easily hydrolysed. All burns with liquid lewisite should be instantly treated with a 5 per cent. solution of caustic soda, which again must be itself removed with water as it is irritant also. On admission to hospital the best line of treatment would be immediate excision of the burnt areas if possible. For vapour burns a ferric hydrate paste containing colloidal ferric hydrate is advised.

Lachrymatory gas shells were first used by the Germans in April 1915, and were used to a considerable extent throughout the subsequent years of the war to harass troops. Deaths due to these gases were very rare. Xylol bromide was first used, followed by brom-benzyl-cyanide and later chlor-aceto-phenone, which proved the most efficient of all. Brom-benzyl-cyanide is very stable, and an area of ground sprayed with it will still retain irritant properties 30 days later, in spite of weather conditions. On the other hand it has the serious disadvantage of corroding steel and all metals, and if fired in a shell it has to be put into a porcelain container. It is soluble in carbon tetrachloride, and an alcoholic solution of sodium hydrate can be subsequently used. Of the lachrymators, however, the one above all others is chlor-aceto-phenone; this is solid under ordinary conditions, but has a low vapour pressure; it is exceedingly stable and is not affected by metals; it may even be mixed with T.N.T. explosive. Further it is cheap to manufacture and causes lachrymation in a concentration of only 0.0003 mgm. per litre. It was extensively used in hand and rifle grenades. In addition to severe lachrymation slight inflammation of the skin may be produced. In strong concentrations men are blinded and unable to open their eyes for several minutes. A solution of sodium bicarbonate for washing out the eyes is the only measure of treatment necessary, whilst an efficient mask is an absolute protective.

Early attention was paid during the war to the possibility of using the very poisonous arsenical gases. Arsenic itself,—AsH₃—is too unstable and too inflammable to use, but the Germans used its derivative diphenyl-chlor-arsine in their blue cross shell. The Germans hoped that when this gas was used in a shell, the burst of the shell would set free a finely-divided cloud of particles which would be fine enough to penetrate the gas mask, cause violent irritation of the nose and throat, nausea and vomiting; this would compel the men to remove their masks, whereupon ether and more lethal gases would be used. As a rule, however, in actual experience it was found that the particles did not penetrate the masks used by the Allies. In some of the German shell dumps as many as 30 per cent. of the shells were blue cross, and captured orders by Ludendorff as late as July 1918, shewed that he expected very great

effects from it. Actually the substance can be much better used as a smoke spray from burning candles of it and "D.M."—diphenyl-amine-chlor-arsine—is even more efficacious. With a slow wind a cloud produced from 500 candles of D.M. liberated on a front of 500 yards produced vomiting among unprotected subjects placed three miles away, whilst it was still irritating six miles away.

Whilst these irritant smokes are not very lethal, they cause very considerable temporary disability. Intense pain in the nose and throat, tingling and smarting of the face, acute lachrymation, a copious running at the nose, nausea, sometimes vomiting and intense headache are the chief symptoms. Giddiness usually occurred and in some cases unconsciousness. Intense mental distress, however, is the chief symptom with these poisons; even mildly-gassed patients are a picture of misery, whilst severely-gassed persons may lose all mental control, commit suicide or suffer from delusions. Paresthesias also were not uncommon. The vast majority, however, were ill for only a few hours. The treatment consists in rest, fresh air, removal of contaminated clothing, washing the nose and throat with boric acid solution or saline, and an inhalation containing alcohol, chloroform, ether and a trace of ammonia; with phenacetin for the headache. An interesting point about the use of these gases is the poisoning of water holes by them, and casualties occurred from using such poisoned water.

Of miscellaneous gases, prussic acid was not used by the Germans but was tried by the Allies. It was found impossible to obtain lethal concentrations under field conditions. Carbon monoxide was not used as a poison but was a frequent source of poisoning in shelled dug-outs, exploding mines, and closed spaces. Phosphorus bombs were but little used; on bursting they scatter burning lumps of phosphorus around, and the element will still continue to burn after it has penetrated the skin if air reaches it. Thermite bombs of ferric oxide plus powdered aluminium, when they burst, produce a temperature of about $3,000^{\circ}\text{C}.$; this melts the iron, and molten iron is thus scattered about, severe burns resulting.

Chapter 12 deals with individual protection against gas, and first details the evolution of the various protective masks adopted by the different Allies. The present American type of mask is the Mark 3, 1919 canister. Essentials for a good mask are that it must have a high rate of absorption, as in rapid breathing the gas may only be in contact with the absorbent for one-tenth of a second; secondly the absorbent must be able to absorb and hold large quantities of gas per unit weight of material used; thirdly its breathing resistance must be low. The actual canister used is a tin box with two holes for inspiration and one for expiration, each protected by a rubber valve. The corrugated tube—corrugated to prevent its kinking—is attached at one end to the nozzle and at the other end to the face piece. The face piece is made of a special rubber compound, whose outer surface is covered with stockinet, fits so closely to the face by an elastic harness which fits around the head that no outside air can be breathed, and has glass plates in metal frames opposite the eyes. An aluminium tube is inserted in the front of the face piece and has two passages; the upper for the entrance of purified air from the canister, the lower for exit of respired air. The mask is made in five different sizes. The mask is contained in a canvas satchel held in place by webbing straps, whilst the canister is held in the rear of the satchel. The mask weighs 5 lbs. 2 ozs., is simple in construction, and very durable.

The best gas absorbent is charcoal, and the absorbent used in this mask is a mixture of 60 per cent. activated charcoal with 40 per cent. soda-lime. The charcoal is heated in a kiln in the presence of water vapour to a temperature of $850^{\circ}\text{C}.$ for 4 hours; this removes all volatile hydrocarbons from the fine capillaries of the

charcoal, leaving in each granule an enormous capillary bed for gas absorption.

Details for training and gas mask drill follow, illustrated by very clear and numerous photographs; instructions for mask inspection drill, together with an account of a special mask for wear when the face or head is wounded. A further interesting novelty is "Impregnite" underwear, so treated as to be capable of neutralising mustard gas for several hundred hours under field conditions.

Chapter 13 deals with collective protection. Here there are several factors to be considered; not the least the study of local meteorological conditions favourable or unfavourable to the use of different gases. Most gas attacks take place at night, when meteorological conditions are usually more favourable than in the daytime, and when the element of surprise among sleeping men will be greater. Gas sentries should be specially trained. Gas-proof shelters can be constructed in one of two ways; either an air-tight construction is used, all openings being made impervious to gas; or a positive pressure can be maintained inside the shelter by means of air pumped in from the outside through a special canister which removes the gas. Gas-proof shelters should have double doors, the two doors being if possible ten feet apart. A roll blanket door held down by slats is usually fairly efficient. In actual practice gas-proof shelters are not so efficient as they might be expected to be; in the first place they are of semi-permanent construction; in the second, gas is carried into them in the clothing of persons using them. In removing gas from a dug-out or shelter, a fire will create a good draught, and chloride of lime should be used freely, especially after a mustard attack. Clothes saturated with mustard gas should be boiled for 2 to 3 hours, or may be treated with an alkaline bath. Mobile bathing units, 2 units per division, are essential, each equipped with a 1,200 gallon tank and devices for heating water and generating steam. Supplies should be protected against gas, as gas affects many of them as well as men. Food must be kept protected especially; also metallic and surgical instruments.

All medical officers should be trained in the measures to be taken against different forms of gas attack. Patients gassed with pulmonary irritants should be removed immediately before serious oedema has had time to set in; mustard gas cases should not use the ordinary ambulance, as they will infect them. Most of such cases, after first aid treatment to burns, etc., are capable of walking back to the collecting station. The collecting stations in question should be for gas cases only. At the collecting stations many cases which are doubtful should be retained for 24 hours to see whether they are really gassed or are malingering. A mobile bathing unit is an essential element of the gas collecting station. Finally, at the gas hospital centre for each area trivial cases should be detained, as they will soon be ready to return to the front; cases severely gassed by mustard should be evacuated as their treatment will occupy months; phosgene cases will have either died or will be on the road to recovery within 48 hours; but if recovering after that period should be evacuated lying down to convalescent camps. Finally, it should be noted that gas casualties diminish when there is rapid advance or retreat, and tend to become most numerous in stationary warfare or in heavy fighting.

Turning to the ultimate results of gas poisoning, the deaths among 1,80,983 British gas casualties numbered 6,062, or only some 3.4 per cent. for the whole period 1915 to 1918. Gas poisoning was responsible for only some 2 per cent. of pensionable disabilities, 35 per cent. being caused by wounds, and 63 per cent. by disease. About 88 per cent. of gas cases received no permanent injury. In the remainder the average degree of disablement was only some 20 per cent. There is no real evidence that gassing increases the liability to tuberculosis; on the contrary, so far as the evidence goes, men who have been gassed suffer less from tuberculosis than normal individuals under the same circumstances.

Many of the so-called chronic gas poisoning cases were cases rather of war neurasthenia; but few of those who drew a pension would ever admit a subsequent improvement or cure.

Chapter 16, on naval medical aspects of chemical warfare, is by Lieutenant Commander D. C. Walton, M.C., U. S. Navy, who points out how ancient is the use of poisonous gases in warfare; the classical "Greek fire" having been used by the Greeks for some 500 years, whilst quicklime has frequently been used in naval warfare. Gas was not actually used in naval warfare during the Great War, except from land batteries during the attack on the Mole at Zeebrugge, in 1918. Temporary lung irritants, vesicants, lachrymators and sensory irritants are not likely to be used in naval warfare during a fleet action; "practically all gases used at sea would be of a persistent nature, and only those which act rapidly on the organism would be used during an engagement." Smoke screens, of course, are very largely used in naval warfare, and the author gives some very striking photographs of their production by destroyers and aeroplanes; in fact his view of New York harbour being blotted out by a smoke screen from an aeroplane on May 2nd, 1924, is so startling as to seem almost unreal. In general the measures for individual protection at sea resemble those for land warfare. Closed action stations can easily be rendered gas-proof; in semi-closed stations a plenum fresh air system would expel gas or keep it out; whilst in open stations masks and protective clothing would be required.

In a final chapter Colonel Vedder discusses the possible therapeutic applications of chlorine vapour. During the influenza epidemic the men working at Edgewood Arsenal on chlorine plants practically escaped untouched, and this led to an investigation of the value of chlorine gas. It was found that concentration of 0.021 mgm. of chlorine per litre of air killed bacteria in from 1 to 2 hours. A gassing chamber was constructed with a concentration of 0.015 mgm. per litre and it was found that patients could tolerate this for one hour or more. The results in coryza, chronic rhinitis and bronchitis were distinctly encouraging. In addition to its bactericidal effect, the chlorine gas stimulates the flow of lymph to the mucous surfaces, causes hyperaemia and stimulates phagocytosis. A special chamber has been designed in which it is possible to maintain this concentration for an hour at a time, and chlorine rooms are being designed for hospitals. It is even suggested that, in order to prevent the spread of influenza, infectious catarrh and the like, in cinema theatres and other places ventilated on the plenum system, a certain amount of chlorine might be introduced into the atmosphere prophylactically. Certain diseases however fail to respond to chlorine treatment, such as hay fever, asthma, pneumonia and tuberculosis.

Colonel Vedder's very interesting book should appeal to a wide circle of readers. It is essential for the administrative military medical officer, who may at any time be faced with the necessity of devising a medical organisation against gas. It will also interest chemists, pathologists, and medical men in general.

R. KNOWLES.

THE AIMS OF A MEDICAL MAN.

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(Being an Address delivered at the opening of the
winter session of the Carmichael Medical
College, Belgachia, Calcutta.)

WHEN your Principal did me the honour to ask me to address you on this occasion I chose for the subject of my remarks the "Aims of a Medical Man." My choice of this subject was largely directed by the fact that I have long been asking myself the question:—What are the present-day objectives of the medical profession?

It seems to me that this is a question that all medical students must ask themselves because, not only in this country but also in the world at large, it now and then appears as if medical men were in danger of forgetting those great ideals which formerly animated the leaders of our noble profession. For many years medical men have rightly prided themselves on the fact that as a class they have almost invariably placed the care of their individual patients and the welfare of the community before their own personal interests. In fact it had been largely true of medical men, in the past:—

"Then none was for a party,
Then all were for the State;
Then the great man helped the poor,
And the poor man loved the great."

But times have changed, and nowadays we hear of doctors combining just like labourers and artisans in trade unions for the purpose of enforcing their demands, and threatening to "strike" if those demands are not acceded to. Recently a circular from the secretary of an important medical organisation came into my hands; this organisation claims to represent a most powerful body of medical opinion whose object is stated to be "*the promotion of the medical and the allied sciences and the maintenance of the honour and interests of the profession.*" And on reading the circular I was amazed to find that it said very little about the promotion of science, and nothing about the honour of the profession. On the contrary it was mainly devoted to a description of the material advantages that medical practitioners might expect to receive if they became members of the Society. Indeed, the greatest emphasis was placed upon what were termed medico-political and social advantages. And on referring to the appended list of the current medico-political activities of the Society to see what its aims actually were, I discovered that every one of the objectives mentioned was related to the remuneration to be received by medical men, especially in cases where they were employed by the State or by local authorities. Now this is evidence of a most regrettable state of things. And I may state at once that it is a grave departure from the traditions of the noblest of "those three noble professions" which to quote the words of Sir Thomas Browne "all civil commonwealths do honour." Fifty years ago this same great medical society of which I speak was taking the foremost part in the work of sanitary reform, and was using all its prestige and influence to impress upon the British Parliament the need of efficient public health legislation. These were medico-political activities worthy of the name; and it was disinterested efforts of this kind that have earned for the medical profession the honourable position that it has so long commanded. In those days it seems to me medical men must have imbibed much of the spirit of Sir Thomas Browne's *Religio Medici*, and must have echoed, perhaps, unconsciously the words of this great physician who wrote and practised in England 250 years ago. "I feel not in me," said he, "those sordid and unchristian desires of my profession; I do not secretly implore and wish for plagues, rejoice at famines, revolve ephemerides and almanacs in expectation of malignant aspects, fatal conjunctions and eclipses. I rejoice not at unwholesome springs nor unseasonable winters; my prayer goes with the husbandman's; I desire everything in its proper season that neither men nor the times be put out of temper."

"Let me be sick myself, if sometimes the malady of my patient be not a disease unto me. I desire rather to cure his infirmities than mine own necessities. When I do him no good, methinks it is scarce honest gain, though I confess 'tis but the worthy salary of our well-intended endeavours. I am not only ashamed but heartily sorry that, besides death, there are diseases incurable; yet not for my own sake, or that they be beyond my art, but for the general cause and sake of humanity, whose common cause I apprehend as mine own."

It is sentiments of the kind just quoted which have long inspired the best aims of the medical profession of every country, and I am proud to say that, in spite of occasional lapses from this high standard of ethics as in the case of the regrettable circular to which I have previously alluded, medical men in every part of the world continue to show, by their noble actions and example, that they regard the welfare of humanity as of more account than personal interest and advancement and as a class prefer honour to gold. If this were not so how can you explain the fact that the death-rate among medical men usually exceeds that of the general population at the corresponding age periods of life? Why was it, I may ask that in the Crimea the French army lost 18 per cent. of its non-combatant surgeons, while the deaths among its combatant officers were only 7 per cent. And why was it also that during the great typhus epidemic in Ireland in 1843-47 the death-rate among medical men was 66 per 1,000, no less than 32 per cent. of those dying falling victims to typhus, whereas among the general population only 9 per cent. of deaths were due to this disease. It is not lust of gold or personal advancement that will explain figures like these which are practical evidence of noble aims and high ideals.

There is a remarkable book, published in 1918, entitled *The Science of Power*. In this book which I should like you all to read, the late Professor Benjamin Kidd calls attention to what he terms "the emotion of the ideal." He states that it is this emotion of the ideal which is the greatest power at work in the world to-day. In his view the Great War itself affords a striking demonstration of the fact that the vast majority of mankind in every country, when actuated by this emotion of the ideal, are willing to sacrifice all hope of personal comfort and material gain and even life itself for the attainment of what they believe to be the common good. And he goes on to develop the thesis that it is this spirit of sacrifice for an ideal that will prove the most potent of all the influences that are tending to shape the social integration of the future. It is true that some critics of this book have characterised it as "a panegyric of masochism and slave mentality." But we may well ask cynics of this sort, what has become of the "cult of the superman" and where are now the disciples of Nietzsche who taught Germany that purely material gains were the only aims worth working for? Surely the results of the Great War should have demonstrated to every one, but the few who are morally blind that materialism is a hopeless doctrine. And to quote the words of the *Bhagavat Gita*:—"These men . . . in spite of grand . . . And flowery speech, which teach of birth

And fruits of action done on earth;
And how by various rituals done,
Wealth, power and worldly joys are won;
Deceived are they by doctrine vain;
And strive for pleasure, wealth and gain.
Their wisdom sure can never stand
On action's true communion ground."

Truly it has been well said—"What shall it profit a man if he gain the whole world and lose his own soul?" And now let us turn from the general to the particular and enquire what should be the special aims of a medical man. If we look up the words *medicine*, *medical*, and *medicinal* in the dictionary, we shall find that they all pertain to that which is applied for the cure or lessening of disease or pain. Now the word *medicine* itself is derived from various Latin words, i.e., *medicus*, pertaining to healing, or *mederi*, *medeor*, *medicare*, all of which relate to healing, or to restoring. We find also that the Latin word *mederi* is related also to *meditor* or *meditare*, to meditate, and that this in turn is again related to the Greek *medos*, meaning care.

Primarily, therefore, a medical man is one who professes to heal or who at least seeks to heal. Now let us ask ourselves what healing is. The dictionary tells us that:—

Heal means to make whole and healthy, to cure, to remove or subdue what is evil, to restore to soundness, to remedy or repair.

Here then we find a ready answer to the question "What are the true aims of a medical man?" Briefly:—

- (1) To make whole.
- (2) To make healthy.
- (3) To cure.
- (4) To remove or subdue what is evil.
- (5) To restore to soundness.
- (6) To remedy.
- (7) To repair.

Carrying our analysis a little further, we may ask, "What is health?" Health is wholeness, and the word *heal* is itself derived from an old Anglo-Saxon word meaning literally, *whole*, *perfect*, or *healthy*. And if we push our enquiries still further we shall find that there are a vast number of other important concepts grouped round this great central idea of health and healing. For example the word *hail*, meaning to salute, is derived from the act of wishing a person good health; and the very word *salute* also has a very similar derivation from the Latin *salus* meaning sound, or *sanitas* meaning health, or *sanare* meaning to heal.

But there is another very significant word closely related to the word "health" and the idea of healing to which I want to draw your attention. This is the term *holy*, which as you will readily perceive brings the conception of the healing art very close to religious duties and aspirations. And if we were to carry our investigations still further we should find also that the ideas embodied in the very terms *sanct*, *sanctum* and *sacred* are in the end bound up with similar notions of wholeness and perfection. When we remember these facts we shall realise that it is by no means strange that the early history of the practice of medicine in every part of the world shows that the art of healing has always been closely associated on the one hand with priesthood, and on the other with the teaching and practice of religion.

Now there is another important point to which I wish to draw your attention. You will observe that the word *healing* and the phrase *to heal* do not imply action taken for personal advantage, on the contrary they suggest something done to benefit others. Everyone knows that the sentence "*Physician heal thyself*" was both meant as a jibe and understood as such. In fact medical men are constantly engaged in healing others, and as incidents in the lives of thousands of medical heroes have frequently proved, very often it is a case of "he saved others, himself he could not save." And here I may observe that the very words *safe*, *save* and *saviour* are also connected with the idea of health or making whole, and so also is the word *redeemer* which is often used in the same sense as *saviour*.

Now we do not call a man who merely saves himself a saviour, but we apply that term only to one who saves others, and in this sense all medical men are saviours. Everyone must know of instances in which medical men have saved the lives of others at the cost of their own. A few years back a medical man in the Darjeeling district, who was well known to me, while lying sick of influenza with a temperature over 101°, received a telegram stating that one of his patients, living many miles away, had a temperature of 106°. There was no one else to go and my friend rose from his sick bed and rode through the inclement weather to the bed-side of the patient. After doing what was necessary for his patient, he found that by an error a temperature of 106° had been written instead of 100°, the doctor returned to his own sick bed, never to leave it except as a corpse. Now while one may regret the error which led to a needless sacrifice, no medical man can help feeling a thrill of pride every time he hears of such a case to think that it was a member of the profession to which he himself belongs who at the call of what he believed to be his duty willingly laid down

his life, for the sake of his patient. Let us contrast this incident with another which came under my personal notice many years ago in a Bengal district. In this latter case a fairly prosperous cultivator lay ill with small-pox. His relations sent for a qualified local practitioner, but the doctor refused to come until a fee of Rs. 32 had been placed in his hands in advance. On receiving the money the doctor went to the house of the patient, but while passing through the court-yard he saw standing there a pony and a pair of bullocks and promptly demanded that these should be given to him in addition to his fee, at the same time threatening to take his departure without seeing the patient unless this was done. I regret to say that he got the animals and afterwards saw the patient, who died a few days later. Now I ask you which of these two medical men whose conduct I have described, deserved the trust and honour of his fellow men? The one lost his life, but left behind him enshrined in the hearts of all who knew him a living memory of goodness and self-sacrifice. The other may have secured material wealth, but his gains could bring him nothing but bitterness of soul and poverty of spirit.

Besides being a healer, a saviour, or saviour of his fellow men, a medical man must possess certain other special qualities of which we find some indication in our brief study of the derivation of the word *medical*. We saw that this word was closely related to the Latin word *meditare*, meaning to meditate; and to the Greek word *medos*, meaning care. Obviously, therefore, a medical man should be both a meditative man and a careful man. As a meditative man he must be a thinker, a student and a learner, always imbued with the divine curiosity which will make him an investigator and a patient seeker after truth. He must likewise be a careful man, because it is his duty to care for or to cure bodies, just as it is the duty of the priest to be the curator or "*curé*" of souls. This brings me back to another important point. You will remember that I have already alluded to the fact that the art of healing was at one time practised by the priesthood.

It follows that in those early days the care or cure of the body was directly associated with the care or cure of the soul. You will also recollect that I told you that the word *holy* which is obviously related to the practice of religion originally meant exactly the same as *whole* or *healthy*, from which it follows that a healer must originally have been one who not only made people healthy, but also made them holy. If this is so it is obvious that a medical man should in the very highest sense be a religious man. Now this is a very important conception, because you have probably often heard it said that nowadays science and religion are antagonistic, and it is sometimes assumed that because a medical man is a scientific man he is, therefore, bound to be more or less sceptical of religion. This is a grievous error. The idea that science has destroyed the foundations of religion is absurd. The teaching of Einstein in regard to relativity and much of the recent work that has been done on psychology afford convincing evidence on this point. Einstein has shown that all knowledge is relative. Even the most exact sciences cannot lead us to a knowledge of the absolute. On the contrary you may be certain that the teachings of science are limited and partial in proportion as they appear most logical, most exact and most conclusive. By this I do not mean in any way to belittle science and scientific work. Science has a most important function to perform and we cannot do without it. But like the special sense organs such as the eye and the ear the usefulness of science depends just as much upon what it ignores and excludes as upon what it reveals. In fact science could not reveal as much as it does if it did not at the same time exclude everything that was not strictly relevant to the subject under immediate observation. Thus it gives us very brilliant illumination over a limited area, so that the important facts with which it deals stand out clear and distinct, but at the same time unless we are careful the

very brilliance of the illumination tends to dull our appreciation and obscure our vision of other facts that are not included within our purview at the moment. If you have been working in a brilliantly-lighted room and then suddenly go out into the badly-lighted street, you know what happens. For a time you cannot see, everything appears dark and you may easily stumble against objects that are clearly visible to those whose eyes have not been dazzled with an excess of light. So it is with some scientific men, who become so dazzled with the excess of light in their own narrow sphere of thought that they become blind to the great truths of religion that are clearly recognized by those who have retained a wider outlook on the problems of life in general.

Science deals with the particular rather than the general, and more especially with what we term the material; and as you know, its methods are largely those of analysis. Now while it is very important that men should study the particular,—in other words that some of us should specialize in order that the sum total of knowledge may be increased; and while for this purpose analytical methods may be of great value, we must never forget that specialization and analysis have their own limitations. A simple illustration will demonstrate this fact. Just let us imagine for a moment that an intelligent inhabitant of the planet Mars, possessed of faculties and training very similar to our own, were to pay a visit to Calcutta, descending on the *maidan* near the Victoria Memorial. Let us suppose that that huge building were to attract the visitor's notice and prompt investigation, and that he were to apply scientific methods of analysis in order to satisfy his curiosity. Let us imagine him saying to himself "here is a huge mass of material which possesses a peculiar shape suggestive of some definite function and purpose; let me discover what it is composed of so that I may understand it." Let us imagine that he was able carefully to take the building to pieces, beginning with the dome and gradually descending to the foundation, and that every stone was counted and was duly classified according to its shape, size, or some other standard.

When the work of destruction was complete all that would be left of the Victoria Memorial would be a number of neatly arranged piles of material and an accurate inventory of the contents of each pile. And even if our visitor had taken the trouble while demolishing the building, to prepare careful plans of it so that he could afterwards reconstruct it, he would still remain entirely ignorant regarding its origin, its purpose and the various ideas and emotions which it embodies and symbolises. Yet it is apparent that a knowledge of these very matters is absolutely essential for a true comprehension of the Memorial and all it stands for. Now if you have interpreted this little parable aright it will help you to an understanding of the respective functions of science and religion. The main task of religion is to do what science cannot do, to comprehend life, for religion is concerned with life as a whole, whereas science merely deals with various aspects of life. Once you have grasped this fact you will realize that science and religion can never be really antagonistic, and that science can never replace religion, but that both are necessary to the welfare of mankind.

Medical men are concerned in a very special manner with the welfare of mankind, for the aim of the medical profession for countless ages has been to discover in what that welfare consists and how it may best be secured. Nearly 2,500 years ago Hippocrates established a noble order of priesthood in the temple of *Æsculapius*. In those days the physicians were priests, the places in which they worked were holy, and the arts of healing that they practised formed a sacred ritual. In those days also, before anyone was admitted to the great order of doctor-priest or priestly doctor he was obliged to swear a solemn oath always to do his duty to his patients, to reveal none of their secrets, and to consider himself not all where their interests were

concerned. And although times have changed, the young medical graduate is usually required, even at the present time, to take the same great Hippocratic oath when he receives his degree. It is not without good reasons, therefore, that I have impressed upon you the fact that a medical man should always be a religious man; for the profession he has chosen is a sacred calling and the oath that he has taken is a religious vow.

A recent medical writer in the *Observer* has wittily remarked:—"Druggists should dispense drugs; doctors should dispense doctrine." And as you will readily perceive, I have endeavoured in this address to follow out the above suggestion by avoiding all reference to drugs and confining my remarks entirely to doctrine.

Finally, as a fitting conclusion to the doctrines I have been dispensing, I wish to direct your attention to some of the wonderful teachings which you will find in your own great *Bhagavat Gita*. What better guide to conduct can anyone find, be he a medical man or a layman, for example than the following:—

"Those men who do to others great and small
What good they can, and rule their passions all.
Who see all equal and do none disdain,
They too—the spirit seekers—Me attain.

"Whate'er you do, enjoy or give, endure
Whate'er perform of rites and worship pure,
O Kunti's son! all those in Me resign,
And never think that fruits or acts are thine.

"By working thus, from bonds of action free—
Fruits good or evil both—wilt gain thou Me,
In Me resigned entire, the holy soul
Doth Me attain all free from world's control.

"Of fruits regardless wont to be,
From chains of birth forever free;
The learned joined to wisdom gain
A state diseaseless, free from pain.

"The patience by which one can well control
The working of the senses, life and mind,
Which fixed on these does want no other goal,
That patience, friend, is of the saintly kind.

"The wise with knowledge such do Me adore
And from their inmost heart devotion pour;
They live in Me, they have their minds in Me
And 'mongst themselves, expound My nature free.
And still of Me do talk and thus do gain
Contentment, sure purest joy attain.

"As boats by gales and storms are tossed
Now here, now there, and often lost;
So human wisdom by a mind
Which follows senses wild and blind,
Is driven and dashed and made a wreck,
So keep thy senses well in check.

"Yet not as sin enjoyment shun,
Enjoy the world; but see 'tis done
With senses under self-control
And free from love and hate; the soul
Enjoying objects thus doth gain,
Contentment void of earthly pain."

HINTS TO MEDICAL MOTORISTS.

By J. W. D. M.

THE motor car has now become an essential article of equipment of most medical men. To the doctor time is money,—often it is something more,—a human life.

To the motorist who leaves his car entirely in the hands of a paid driver, motoring is expensive; but to the man who takes an interest in looking after it and who drives it himself the car becomes an inexpensive means of travel and also an interesting hobby.

From the nature of his training the medical man should have little difficulty in learning about the

mechanism of his car, and when trouble arises he ought to be able to deal with the emergency with greater efficiency and resource than can be expected from an unintelligent driver.

We can strongly recommend motoring as a healthful and money-saving hobby to those who find a car a necessity in their daily work.

These notes are not intended to take the place of a book of instructions. Every motorist worthy of the name will learn the theory and practice of the internal combustion engine from one of the excellent books which are published; he will also carefully study the book of instructions which is supplied with his own make of car.

The first essential of the good motorist is to learn to leave his car alone as much as possible. He will see that it is properly oiled and cleaned, and he will periodically go over the car to see that the nuts are tight, but he will never undo a single nut unless there is a good reason for doing so. The car has been put together by experts, and when any important part has been dismantled it will seldom be so well re-adjusted as it was when it left the works. Meddlesome interference will shorten the life of the car nearly as much as neglect.

It is not necessary to do the work of oiling and cleaning as a routine, but once a month or preferably once a week the owner should go over the car and see that the driver has not forgotten to oil some essential part simply because it is not in an easily accessible position.

The first problem in connection with a car is its purchase, and it is in this matter that the beginner often has to buy his experience dearly. He should decide whether to buy a new or second-hand car, and as a rule the beginner will be well advised to go in for a new car unless he has complete information as to the condition of the second-hand car of his choice.

The commonest mistake is to be tempted by a large, cheap, second-hand car. The imposing-looking mount often looks dirt-cheap at the price, but when the cost of repairs and running and the difficulty in getting rid of the car are considered the owner will often have cause to regret that he has bought a white elephant. If, on the other hand, he has an opportunity of buying a car which has been in use in his own station, if he knows its history from the beginning, and if he has the assurance of a real expert that the car is in sound condition he need not hesitate to buy a second-hand vehicle. Let him, however, estimate the cost of a new set of tyres, a coat of paint, perhaps a new hood and a general overhaul should these be necessary.

In buying a new car there is a bewildering array of models from which to choose, and there is no "best car" for all possible purposes. For certain kinds of work the humble Ford will be most suitable; for others one of the small English or French cars will be more satisfactory.

The points to consider are:—

1. The smallest car which will serve the purpose should be selected, as the cost of tyres and petrol will be less, especially if long distances have to be covered. In every case a small, good car is a better bargain than a larger second-rate mount.

2. A car which is popular in the locality should be selected unless the owner is an expert and can rise superior to considerations of repair facilities and second-hand value. Of two cars which are equally good, the one which is best known in the locality is always most satisfactory, especially for the beginner.

3. If bad roads have to be traversed see that the clearance of the car is sufficient; for really bad roads the Ford in some cases is the only possible vehicle. If the roads are good the small English or French cars are usually preferred.

4. The type of body will depend on circumstances; as a rule a light four seater is the most serviceable, especially if touring has to be done. For station work a light two seater with a dicky seat will be chosen if

the car is only used by the doctor himself and not as a family conveyance.

Heavy closed cars are more expensive to buy and to run, and in India the body work will give far more trouble than that of the open car.

When first you decide to buy a car make a fair estimate of the real cost. Make allowance for interest on the capital cost, depreciation, repairs, tyres, petrol and insurance. You will perhaps be a little surprised at the real cost of keeping a car, but if you have begun by counting the cost you will probably be agreeably surprised to find that your estimate has been in excess of the reality; whereas if you count only tyres and petrol you will be seriously disillusioned when you make up your bills for the year.

Depreciation is an item which varies enormously. If you buy an expensive new car and have to sell it at the end of a year or two, thirty per cent. may not be too much to reckon; but if you drive your car carefully it may still be worth a good deal at the end of ten years of steady work, so that the depreciation will work out at considerably less than ten per cent. A fair average for a good car, carefully used, is twenty-five per cent. for the first year and ten per cent. for each successive year.

In the case of a really good, cheap second-hand car the depreciation may work out as low as five per cent.; but if you have bought one of the white elephants already referred to, the depreciation may easily be fifty per cent. or more in the first week.

With present prices motoring is now much cheaper than formerly. It is quite common to find small cars which will do thirty or thirty-five miles to the gallon over long runs, and tyres which are properly looked after will do close on ten thousand miles, so that running costs for the owner-driven small car will work out at surprisingly low rates.

In the case of a good new car, repairs should cost next to nothing for the first year and very little even in later years.

Hints on the Management of the Car.—Go slow at first, and if you have any trouble find out what is the matter. Do not carry on with a lame car in the hope that it will right itself; you might as well advise a patient to carry on with a sprained or fractured leg as to drive a damaged car.

Starting up may give a lot of trouble at first. Don't use your self starter when the car is cold, you may ruin your battery in vain attempts to start a car which is wrongly adjusted, and you may find that you have damaged or destroyed your battery, while the trouble is due to the petrol not being turned on or the ignition being switched off.

If the car refuses to start at once find out what is the matter. See that the petrol is reaching the carburettor; that the switch is on; and that your compression is right. If these points have been attended to and all the levers are in their proper places, and yet the car will not start, see that the make and break of the magneto has not stuck up; that the valves are closing properly; and that the plugs are clean and are sparking properly. If the car still gives trouble get an expert to help you. Some cars are naturally difficult to start in the cold, especially if the jet of the carburettor is small and is set for economical running. Under these circumstances flooding the carburettor or fitting compression taps and pouring in a few drops of equal parts of petrol and ether into the cylinders will set matters right. But remember that in some cars flooding the carburettor causes the mixture to be too rich, and the remedy is to give more air and work the engine by hand until the excess of petrol has been disposed of. When the engine is hot don't flood the carburettor before starting; you will make the mixture too rich and the car will stutter and refuse to start.

Driving.—The beginner should spend a good deal of time in learning to manage his gears; to start without straining the transmission; to reverse and to apply the brakes gently but firmly. Straightforward driving on

the open road is so easy and attractive to the beginner that he often goes for long distances before he has really learned to drive properly. Before you drive a yard be quite sure that you know how to stop the car instantly and how to manage the gears and clutch.

At first you should select an open and secluded place and be quite sure that the car is fully under your control before you risk your car and the lives of pedestrians.

One of the chief difficulties of the beginner lies in gear changing, but an hour's practice in changing up and down will teach you far more than several days of driving on the open road.

You are not a competent driver until you can change up and down without noise and jar; and the little trick called double declutching should be mastered straight away. You will meet people who have driven a car for years who still dread changing down. The result is that they stick to top gear when the car is calling loudly for the second gear; the whole mechanism is seriously strained as a result.

It is important to learn by experience the engine speed which approximately corresponds to the speed of the car not only in the top gear but also in the low gears, and to let in the clutch only when the engine speed and the road speed correspond with each other. For instance, if the engine is racing with the clutch disengaged, you will seriously strain the car if you go into top speed while the car is at rest or moving slowly; and on the other hand, if you attempt to go into low gear with the car travelling rapidly, the effect will be that the gears will be damaged or destroyed.

To start from a standstill let the engine run quietly at a moderate speed, take out the clutch, put in the lowest gear and then engage the clutch very gently but deliberately so that the car moves forward without a jerk. As soon as the car is moving take out the clutch, promptly get into second gear and again engage the clutch. Gradually accelerate until the car is moving at a pace of at least ten to twelve miles an hour; take out the clutch, let the engine slow down, get into top gear and then let in the clutch. In each case accelerate the engine gently just as the clutch is being let in.

In changing down from top speed to second the manoeuvre of double declutching is most useful. This sounds a little complicated when described, but in practice it soon becomes very easy, and when you have mastered the art you will no longer have the temptation to remain in top gear when the engine is labouring and demanding to be put into second speed. The steps are:—

1. Take out the clutch.
2. Put the gear into neutral.
3. Let in the clutch again for a moment while in neutral.
4. Take out the clutch and instantly go into second gear.
5. Let in the clutch again.

Try to keep the engine at the speed at which it ought to travel when the car is moving at the actual pace in the second gear.

With a little practice you will get into second speed every time without the slightest noise or jar, especially when you have found the right degree of engine acceleration which suits second gear at the pace at which the car is travelling. Most drivers cling desperately to top gear because they are afraid to change down to second and because they are proud of doing everything on top speed. When you remember that your engine and transmission work most efficiently and with the least strain at a fairly high engine speed, you will realise that it is a mistake to climb hills at a slow speed on top gear or to accelerate from a speed of four or five miles an hour on top gear. The proper method is to get into second gear as soon as the car slows down to ten or twelve miles an hour or so, and to get into top only when you are travelling easily at a higher speed than this.

The exact time for changing down varies in different cars. With a powerful six-cylinder you can easily accelerate on top from six miles an hour or so, but with the small high speed engines of the light cars it is a great mistake to cling to top gear at low speed.

Make sure that your brakes are acting properly and that they grip both wheels equally. If in doubt as to this jack up both wheels and spin them while someone applies the brakes gradually. If both wheels stop together, your brakes are acting properly; but if one grips while the other does not act, an adjustment is necessary. In the case of four wheel brakes see that the front wheel brakes act equally and that they act a little before the back wheel brakes. Having adjusted the brakes and tested their efficiency under running conditions, drive without using them, except in an emergency. The good driver will allow his car to come to rest without using the brakes, and he will avoid getting himself into tight places in which sudden application of the brakes is needed. A single fierce application of the brakes will damage your tyres as much as several hundred miles of straightforward driving and will also strain the mechanism.

At corners of streets you must always assume that there will be an obstacle just round the corner; always drive in such a way that you can pull up easily within the distance that you can see ahead.

In streets assume that a child is likely to rush across the street from every doorway, and so keep your car thoroughly under control.

Be sure never to pass a vehicle without seeing a clear road ahead.

On a slippery road there is no means of avoiding skids. A skid is rarely serious if you are going slowly, whereas at high speeds disaster is likely.

Economy in petrol depends on driving at a moderate speed suited to your car, on the perfection of the oiling and adjustment of the engine, on the proper adjustment of the carburettor,—especially of the jet,—on closing the petrol tap when you stop, on the proper adjustment of your spark advance and on the perfection of your compression. If you pour a little oil or water round your sparking plugs and cylinder caps you will often find that air is escaping when the engine is running. New washers or tightening up the plugs and caps will completely stop this and you may get four or five more miles to the gallon of petrol in consequence of a few minutes' work.

If your engine knocks there may be need for decarbonisation or possibly your ignition is too far advanced. A knock is always a signal for an examination to find out and rectify the cause.

If the beat of the engine becomes irregular, look first to your plugs; see that the wires are, securely attached at both ends, then test the plugs while the engine runs slowly by using one of the simple plug testers that are on the market. When you have found which plug is not functioning, remove it and clean it thoroughly with petrol and look to the separation of the points. Keep a few new washers for the plugs and always use one after taking out a plug.

If the water boils in the radiator under circumstances in which there is no special strain on the cooling system, look to your fan and radiator. If these are in good order there is likely to be too great a retard in the spark or the mixture may be too weak.

Do not tolerate a fierce or slipping clutch,—either defect will cost you dear. Immediate attention is essential. You may merely have to adjust the clutch pedal or the lubrication may be defective.

In the older type of car you may have to allow your clutch to slip a little on certain occasions; in the newer high speed engine you should not slip the clutch at all, you must change down when the engine shows signs of labouring.

Tyres must be kept at the proper pressure. A special tyre gauge must be used; the gauges which are supplied with pumps cannot be relied on.

A foot pump with a self-fixing connection for the tyre valve is a great comfort; it is instantly attached and does not allow of escape of air.

If your front tyres show signs of rapid wear, have your wheels tested to see that they are exactly parallel. After a collision or even from wear and tear the wheels may get out of alignment and it is not uncommon for tyres to wear out within a few hundred miles on account of this.

Balloon tyres are coming rapidly into use on small cars. They slow down the car very slightly, but owing to the way in which they yield to inequalities on bad roads they allow of a much higher average speed than ordinary tyres. They also save the machinery from shocks and give you great comfort on rough roads. They may be fitted to ordinary rims if the clearance between the front wheels and the chassis is sufficient, but it is more satisfactory to have them fitted on the car from the beginning. Most makers now supply them as standards or on special order. In the case of large cars you need not fit them unless the makers recommend their use.

Keep an eye on your battery. It is more likely to give trouble in India than in cold climates, and if you live in places away from workshops you will find it desirable to fit oil side lamps or to keep a pair in reserve in case of battery failure. On the whole it is better to stick to magneto ignition rather than to trust to battery ignition alone. In the latter case if the battery fails your car will be thrown out of commission.

Don't use your self starter too much. It is better to use the starting handle in the morning or in case you have to make very frequent halts after short runs.

Don't spend a lot of money on accessories. Most cars are already supplied with all that are needed. A speedometer is useful, so is an electric horn, shock absorbers, a fire extinguisher, a radiator thermometer, and a petrol gauge, by which you can see from the driving seat how much petrol is in the tank. The gauge can easily be fitted to dashboard tanks, but is hardly practicable for pressure-fed tanks such as are fitted on many large cars.

If you are held up by a broken spring, get two flat pieces of iron,—even tyre levers will do,—place one above the spring and the other below, bind them tightly with a strong piece of cord, wet the cord and it will grip still more tightly, then go slowly home and arrange for a new spring leaf or for a proper workshop repair.

You will save many rupees a month if you drive yourself, and if you spend an hour once a week in attending to the toilet of the car.

The good driver is not only considerate of his own car, but also of the other users of the road. Cattle and drivers of bullock carts may be relied on to do the wrong thing, not out of perversity but from ignorance, and it is your duty to make every allowance for them. Merely getting angry with them will not compensate you for a damaged or disabled car, so it is in your own interests to observe forbearance and foresight.

You will soon find that it is false economy to go on using a damaged tyre. You may get an extra hundred miles out of a groggy tyre, but as a rule you will destroy a good inner tube and probably have a lot of trouble on the road, and these will far more than compensate for the scrapping of the tyre a little earlier than is absolutely necessary.

Even if you don't make a practice of changing a wheel or tyre you ought to master the art of doing so. You will save money and trouble by seeing that the rims are thoroughly clean and dry before a new tyre is put on; also by seeing that the nuts of the wheels as well as the false axle on which the detachable wheel fits are greased or oiled. If these parts get rusty you may have a terrific struggle to change a wheel when you have a puncture. Also test the tightness of the nuts which hold on your wheel; these are likely to become loose after the wheel has been changed, so look to them after a few miles of running.

Most owners are careful to see that the outside of the body work is in good order. It is equally important to keep the concealed woodwork well painted. The same applies to the under surfaces of your mud-guards. Rust and rot cause a heavy addition to your bill of costs if you do not attend to these points.

Rattles and squeaks should be located as soon as possible, and it is a good thing to go over all the nuts on the car now and then, especially those which hold the springs on their seatings.

Have a good chamois-lined petrol funnel and see the petrol poured in for yourself. Attention to this point will save you the unpleasant experience of having to clean out an obstructed carburettor when you are in a hurry to visit a patient.

It is pretty certain that the careful owner who drives his own car can cut down his motoring expenses by twenty-five or thirty per cent. as compared with the man who leaves everything in the hands of a paid driver. The bills for wages, petrol, oil and tyres will be much less, and his car will last at least twice as long.

The writer of these notes has been an owner-driver for the past seventeen years. He has not always practised what he preaches, but by spending an hour once a week on his car he has kept his motoring costs down to a figure which would have been entirely unattainable to the owner who trusts to the tender mercies of a paid driver. He has also obtained a great deal of pleasure from his cars; one of which is in perfect running order after thirteen years of hard wear.

Current Topics.

Wounds and other Injuries in their Medico-Legal Aspect.

A LECTURE delivered before the Medical Society of London by Sir Bernard E. Spilsbury, M.B.—*Lancet*, February 28th, 1925.

The following extracts from the first lecture will be of interest.

A contusion, or as it is commonly called, a bruise, is a crushing injury produced either by excessive pressure upon the surface of the body, or by violent contact with an object which is relatively incompressible, and which is of such a form as to produce no gross injury to the surface.

The resulting hæmorrhage is more rapid and profuse, and instead of infiltrating it pushes aside the crushed tissue to form a cavity filled with blood—a hæmatoma. A very similar effect is produced by a foreign body such as a bullet tearing its way through the tissues; if its progress is arrested by the skin a bruise speedily forms in the subcutaneous tissues around it. It is the causative factor which differentiates contusions from hæmorrhage into the tissues, due to excessive pressure within the blood vessels, or to disease of the blood-vessels and tissues. If the violence is maintained until death, and for a short time afterwards, there may be no escape of blood from the torn blood vessels, the only effects of the crushing force being some pitting of the skin, and perhaps slight softening of the damaged area; usually, however, a little blood escapes at the margin of the crushed area and the hæmorrhage becomes more evident if the compressing object alters its position. This explains the slight amount of bruising which may result from the pressure of the fingers of an assailant upon the neck of the victim in a fatal case of throttling, although the violence may have been so great as to have led to the production of hæmorrhage in the loose cellular tissue between the larynx and the spine.

A bruise inflicted shortly before death, which is not visible on the surface of the body, may become apparent a few hours or several days after death. This is

due to a more rapid hæmolysis in the stagnant blood as a part of post-mortem changes. The pigment diffuses locally, producing a stain in the surface, dark red at first, but changing sometimes to a brief red colour from absorption of oxygen through the skin; or an area of dark green putrefactive discoloration appears over a deep bruise before the skin around it is changed. Two minutes after death no appreciable bruising occurs and the amount of blood effused, when death follows immediately upon the infliction of the injury, will be slight in comparison with the amount when the injured person survives.

Sir Bernard has seen several cases in which death resulted from the shock of multiple contusions.

In one, a woman about 45 years of age, who had been brutally assaulted and who was found dead in her apartment, six bruises were found on examination of the body: three of these situated on the face and head were of large size and were caused by severe crushing. There were no open wounds upon the body, little blood had been lost, and there was no disease to account for the death.

Crushing Injuries of the Chest and Abdomen.—Chiefly by motor vehicles but also by falls from a height, crushes by falling debris, by railway trains, and in lift accidents, and by severe blows on the chest and abdomen by cart-poles, kicks by horses, etc.

An examination of the results shows that in one-half of the cases no external injury—not even a bruise or the mark of a wheel—was present at death on the surface of the chest or abdomen; in a large proportion death was due solely to injuries of the organs in these regions, and ribs were fractured in 75 per cent. of the cases. Recorded cases of injury of the chest and abdomen include many in which no external injuries were seen, and I was surprised to find that they occurred in so many of the cases in this series.

Effects Produced by Passage of Projectiles through the Tissues.—If discharged within a short distance of the body there may be surface indications from which the distance of the weapon can be accurately determined, and the path of the projectile through the body enables the exact position of the weapon in relation to the victim to be determined and may give valuable information as to the medico-legal significance of the wound. When the projectile penetrates another object after traversing the body it may be possible to reconstruct exactly the circumstances in which the weapon was discharged, whilst the firm grasp of the weapon in the hand of the victim after death gives a clear indication of a self-inflicted injury.

When a weapon is discharged near the body the external markings are seen principally upon the skin and clothing around the entrance wound. They vary with the type of cartridge and the nature and amount of the charge and are less distinct when smokeless powder is used. The changes produced by black powder are due to flame when the discharge is very close, to smoke for a rather longer distance, and to unconsumed powder at a still greater range. Flame may singe or set fire to clothing, singeing the hair and slightly burning the skin, with the formation of a glazed, brown, parchment-like area after death. Smoke, when the discharge is fairly close, produces a uniform black deposit, and grains of unconsumed powder expelled from the weapon behind the projectile are carried for a distance possibly of several feet, spreading like small shot, and with such force that they are embedded in the skin and clothing, and produce characteristic tattooing.

The pattern produced round an entrance wound in a given case may be reproduced by experiment, using the same weapon and cartridges of the same manufacture; the distance at which the weapon has been discharged may thus be estimated with a fair degree of accuracy.

In cases of self-inflicted injury, blackening and splashes of blood may be found upon the hand used

to steady the weapon at the muzzle end. The external indications of a near discharge may be absent when the muzzle of the weapon is pressed firmly against the skin, the gases of the discharge, the flame, smoke, and powder grains all following the track of the bullet into the body.

Apart from splitting of the skin produced by the gases of the discharge the wound of entrance is generally small, circular when the weapon is discharged at right angles, and oval in shape when the bullet has entered obliquely; the margin of the wound may be inverted, though this is by no means constant.

The wound of exit is often larger and more irregular, especially when the bullet has passed through bone; this is due to deformation of the bullet or to laceration of the skin by fragments of bone expelled by the projectile. Multiple exit wounds may be so produced—and this is more frequently seen when the projectile is large and travels at high velocity, splintering the bone at some distance from the skin. The skin at the margin of the exit wound is often everted.

The following is a remarkable example of self-inflicted injury but the coroner recorded a verdict of accidental death. A young man was found lying on his back on the floor of his bed room, dead, the sound of the discharge of a firearm having been heard a few minutes previously. He lay opposite a looking-glass, his left hand was in his pocket, and the revolver containing one empty cartridge case was found in a closed drawer. He had shot himself through the roof of the mouth, the bullet passing through the hard palate in the middle line and vertically upwards, smashing the nasal septum and the cribriform plate, passing through the cranial cavity between the frontal lobes; the bullet was embedded in the fractured vault at the end of the track, the only injury of the brain being a linear bruise on the mesial aspect of each frontal lobe along the course taken by the bullet. The mucous membrane of the palate was blackened by smoke behind the wound. The front of the chin had been injured, probably by the kick of the revolver, and the lips were bruised and slightly lacerated from the sudden escape of gases at the moment of discharge. Asphyxia was the cause of death, blood having run from the nose into the air passages as he lay unconscious.

This was more probably a suicidal act, though it is just possible that he was imitating a suicide, not suspecting that the revolver was loaded. From the slight amount of injury of the brain by the bullet it is possible that he retained consciousness long enough to enable him to place the revolver in the drawer, at some distance from the spot where he was found, and to close the drawer afterwards.

The following is an interesting example of the reconstruction of a murder of a soldier in camp at Aldershot, who was found dead in a hut at night, shortly after the sound of a shot had been heard. The other occupant of the hut, a soldier, was afterwards charged with murder. The death was at first thought to be a suicide, the coroner was informed; an inquest was held without a post-mortem examination and a verdict of suicide was recorded, the body then being buried. Several suspicious circumstances, however, led to the arrest of the other occupant of the hut, and at the time of my investigation he was awaiting his trial at the assizes.

When he was discovered the dead man was lying on his back, covered with bed-clothes up to the chest, and clothed in underwear and socks; his face, turned to the right, was at the edge of the bed. There was a bullet wound on the left cheek immediately below the malar bone which was not fractured, and the characters of the wound and the changes around it were carefully noted by the medical officer. On turning the head the exit wound was found immediately behind the right mastoid process. The weapon, a service rifle, was on the floor close to the bed and between the outstretched arms of the dead man, but was not grasp-

ed, nor were the hands blackened. The cartridge was a Mark 303. After leaving the head the bullet traversed the bedding and a pillow consisting of a bag containing uniform, and an examination of these showed that no metal or other hard object had been struck; the bullet had then passed through the wall of the hut, constructed of two layers of three-ply wood with a space between. In this part of its course the trajectory formed an angle of 35° with the horizontal; it had undergone no deflection in its passage through the wall, and a furrow produced by its striking the path outside was in the same line.

On plotting out upon a skull the line joining the entrance and exit wounds it was found to cross the central nervous system at the junction of brain and spinal cord; the passage of the bullet must have resulted in instant paralysis, and probably instant death. To bring the track of the bullet through the head into line with the track in the wall the head must have been resting on the pillow in a half lateral position when the weapon was fired, and must have rolled completely to the right immediately afterwards. The weapon must have been pointed in a downward direction at an angle of 35° .

To ascertain its distance from the head experiments were made with the weapon, using cartridges of the same pattern, and the blackening seen around the wound in the cheek was found to correspond with a muzzle distance of more than 2 in., and probably about 5 in. The weapon was $3\frac{1}{2}$ ft. long from muzzle to trigger. The dead man was 5 ft. $7\frac{1}{2}$ in. in height; and it was impossible for a man of that height to have touched the trigger with his finger, with the muzzle 2 in. from his cheek, when lying in bed. The weapon could not have been discharged by his foot, as paralysis would have prevented him from replacing his foot beneath the bed-clothes after the weapon was discharged. The wound, therefore, could not have been self-inflicted, and the prisoner was the only other person who was in the hut at the time. He was found guilty.

Homicide by Firearms.

In cases of homicide by firearms multiple injuries are more frequent than in suicides. If an injury in a vital area is associated with one in the hand or arm it is a strong presumption of homicide. The two injuries may have been caused by one bullet, the arm having been raised to cover the body, and in such a case the arm can be placed in a position so that the two wounds come into the same line.

In homicidal cases the distinction of wounds of entry and of exit is often a matter of considerable difficulty, especially when the weapon is a service revolver or a modern rifle. Discharged at a range of more than five or six feet from the body, there will probably be no mark on the clothing or skin around the wound to indicate the wound of entry, and in size and shape the two wounds may be very similar, especially with the more pointed type of bullet, though the exit wound tends to be more slit-like, and the entrance wound circular.

How Interference in Labour may be Lessened by Examination during Pregnancy.

By JOHN S. FAIRBAIRN, B.M. (Oxon.), F.R.C.P.,
F.R.C.S.,

British Med. Jl., February, 1925.

ANTE-NATAL supervision is as yet in its infancy, and much still remains to be done to improve its methods of investigation.

So far as possible, investigation of suspected abnormalities should be made as little obvious as can be. The chief aims of the supervision may be stated as:

1. Maintaining health of body and mind in the pregnant woman.

2. Preserving the pregnancy to full time.
3. Foreseeing and avoiding preventable difficulties in labour.

4. Preparing the mother for the nursing and care of her child and generally educating her in regard to her own health and that of her family.

Dr. Fairbairn first discusses albuminuria. The testing of the urine is the first sieve to strain out cases for further investigation, the next point is to determine the meaning of the albuminuria if it is not due to contamination after the urine has left the bladder; then a further chemical and bacteriological examination may be necessary to exclude those cases due to pyelitis or cystitis.

The next point to determine is how far the renal function is affected, for albuminuria by itself is not proof positive of its disturbance. Diminished secretion, the presence of casts, œdema, and raised blood pressure would indicate renal damage, and to determine its degree the urea concentration test should be carried out. As soon as any impairment of renal function is discovered the essential matter is to keep the patient strictly to bed, and observe what rest with a restricted protein intake will do. In most cases the effect of the diminished metabolism is rapid. If, after a couple of weeks, no improvement results, and still more if the continuance of headache and sickness, increased œdema, and persistent high blood pressure show that the condition is both serious and resistant to treatment, the pregnancy must be terminated, for fear of progressive and permanent renal damage, or, more rarely, eclamptic convulsions.

The next point is to discover the position and presentation of the fœtus, the pelvic capacity, and, so far as possible, to detect any factors likely to complicate the labour. This part of the examination is not begun till the last two months of pregnancy—that is, about the thirty-fourth week—as before then it is rarely possible to discover with accuracy the presentation, and, even if it were, a completely different state of affairs may be present a few weeks later.

The general physical development of the woman should be noted, both in the erect position and when lying down. A height under 5 feet, narrowness across the hips, spinal curvature or other deformity, lameness due to disease of the hip-joint or to infantile palsy, should always suggest the need for special care. Bone or joint disease or other condition that has necessitated a long period of lying on the back during childhood may have checked the full development of the pelvic girdle. The appearance of the abdomen should be carefully observed, both when standing up and recumbent, and the size, shape, and position of the uterus noted.

In a first pregnancy, unusual forward projection of the uterus, especially if persistent even in the dorsal position, indicates deficient space in the abdominal or pelvic cavity.

The diagnosis of presentation and position is carried out by the ordinary obstetrical examination, and should be confirmed again later. Rectification of a breech presentation is most easily effected about three weeks before term, and though rectification of the foetal lie and the uterine obliquity by padding and a binder may be tried in shoulder presentations, the more favourable time, owing to the tendency to recurrence, is as a rule at the commencement of labour. In any case in which external version has been done further examination is necessary to see that there has not been a reversion to the original presentation. Face and brow presentations are rarely recognised at the ante-natal examination, and if recognized, are not readily converted to, or maintained as, a vertex. For the most part they arise at the onset of labour, and, as in oblique lies, reliance must chiefly be placed on discovering the high position of the head and the conditions liable to give rise to them, and trust to rectification at the onset of labour. Occipito-posterior

positions are likewise best treated either just before or immediately at the onset of labour by a pad and binder, after the method of Buist.

Pelvic capacity is tested by two different methods—one pelvimetry, and the other the estimation of the fit of the head into the brim.

The abdominal examination is especially important as the simplest method of picking out those cases requiring further investigation. The head high up and floating above the brim is easily accessible to palpation. If it has descended into the pelvic cavity the fingers must be sunk into the pelvis in order to recognize the hard and immovable mass, filling up the sacral hollow. A high position of the head in a primigravida during the later weeks of pregnancy must always be taken as a warning of possible trouble. In multiparae, especially those with a lax abdominal wall, there is neither the same tension within the abdomen to drive the head downwards nor does the uterine axis lie directly in that of the inlet to facilitate descent, and hence a high position of the head has not the same significance.

A rough test can be made of the relation between the size of the head and pelvis by pressing the head downwards from the abdomen. If the two poles of the head, the forehead and hind-head, can be felt very distinctly a transverse position of the head with some degree of extension is probable, indicating some flattening of the brim.

By pressing the head into the brim with the patient in the dorsal position an impression can thus be obtained of the amount of room and of the ease with which the head will enter, and those cases in which difficulty is suspected should then be reserved for further examination by the bimanual method. The treatment of the minor degrees of misfit between the head and the pelvis is by the induction of labour before the child is large enough to cause difficulty, and yet not too small to give trouble in rearing.

If the patient is examined at the thirty-fourth week, and it is then discovered that disparity between the head and the pelvis is such that even at this early stage natural delivery is unlikely owing to a serious degree of pelvic deformity, Caesarean section at term would be selected. These cases are, however, very rare, and in the lesser degrees of deformity the woman would be seen every fortnight. The fit of the head would be judged by rough estimation until difficulty in pressing down the head was detected, when the bimanual examination under anaesthesia would be made in order to decide the most suitable time to induce.

A natural labour carefully observed and conducted will teach us much more than we can learn from the most thorough examination, and in a young woman with twenty years of reproductive life in front of her it is much better for her future to make a trial trip of her first pregnancy and know by experience what the natural powers can do. Usually they will do better than we expect. On the other hand, in a woman who has had previous labours in which induction has failed to give a living child, or in a woman in her first pregnancy towards the end of her reproductive life, Caesarean section would clearly be the preferable method of delivery, as securing her a living child in what might be her only pregnancy.

We know so little as to the causation of ante-partum hemorrhage that our endeavour must be to take the first occurrence of bleeding as a warning of possible further trouble to come.

If placenta praevia can be definitely diagnosed, it is unsafe to temporize. Eclamptic convulsions rarely occur without albuminuria or other warning signs, and thus their unexpected onset is greatly limited by proper ante-natal supervision; they may, however, occur occasionally in patients under observation and treatment for albuminuria, when they are not usually serious, or may develop suddenly with little warning.

Indian Diets in Relationship to Health and Disease.

At a meeting on April 15th, 1925, of the Medical Section of the Asiatic Society of Bengal, Major H. W. Acton, I.M.S., read a joint paper by himself and Major R. N. Chopra, I.M.S., on "Indian Diets in Relationship to Health and Disease."

The author, in this paper, presented an analysis of Indian dietaries under different conditions of health and disease. Indian ideas on diets were entirely different from European ones; thus the Indian considered that milk was laxative and not constipating, and that it should not be prescribed in bronchitis. The view that meat was unsuitable for the Indian was borne out by the fact that in most Indians the gastric juice was deficient in acid and pepsin. Again the order of a meal as partaken of by an Indian was entirely different from the order followed by a European.

Susruta divides the different articles of food into three classes:—

- (1) Those absolutely beneficial.
- (2) Those unconditionally harmful, such as fire, alkalies and poisons.
- (3) Those which might be included among food-stuffs with certain reservations.

The first series comprise water, ghee, milk and honey. To these are added boiled rice, the salt known as *saindhava* and the juice of the pomegranate and the "*amalakam*." The habit of drinking dirty or contaminated water is condemned; yet to-day drinking of tank waters is responsible for the fact that Bengal enjoys the unenviable reputation of being the home of cholera and the cause of all the pandemics of cholera in the world.

The articles of diet which are wholesome and may safely be included in the dietary are various vegetables such as spinach, the meat of the deer, and the flesh of wild game birds, partridge, pigeon, etc.; also the pulses of various kinds. These may, however, become unwholesome through incompatible combinations. Of such, meat should not be eaten with boiled rice prepared from germinating paddy, or with lard, honey, milk, treacle or *mash dāl*. Milk taken with fresh fruits, or salt, flesh of goat and mutton, or with fish and wine, is poisonous. Honey should not be taken in Spring or Summer, or with any substance heated by fire. Ghee kept in a vessel of Indian bell-metal for 10 days should be rejected. Water should never be drunk with melons, for fear of cholera.

Any two oily substances, such as oil and ghee, or honey with either, mixed in equal proportions should not be taken; nor should water be taken after ghee, honey or oil. Things or substances incompatible in tastes should not be taken together. Meat may be suitable for persons of youthful vigour and strong appetite or in those who have become habituated to it.

These suggestions of Susruta have really a sound physiological basis, claimed the author. Nitrogenous foods such as meat should not be followed by milk, whilst milk is curdled by mangoes and acid fruits. Also meat is not well tolerated in hot countries. In one case a patient put on to a chicken diet suffered severely from urticaria. It was found that the chickens were cooked in suet, and when this was changed to ghee, the symptoms disappeared.

The dietaries of Susruta depended on the *tridosha* theory, which the author next explained. The Susruta interpretation of the Vedas, however, was tantric in character, and very difficult to follow. The three fundamental or primary virtues are held to be *sattva*, *raja*, and *tama*. The *sattva* regulates katabolic changes in a physical plane; the *raja* deals with affections in a moral plane; and the *tama* with spiritual matters in the psychic plane. The three states in the physical plane are the three *doshas* and are:—(i) *Vaya*, the regulative or nervous force; (ii) *pitta*, the anabolic or generative process; and (iii) *kafa*, the katabolic or disintegrating process. Unfortunately the *doshas* had

been symbolized in the physical plane as wind, bile and phlegm.

Vaya really corresponded to the sum of the regulative forces, viz., those in the atom, the primitive—sympathetic—brain, and the central nervous system. *Pitta* was used of both bile and metabolism and heat. *Kafa* was the chyle which filled all the interstices of the tissues. Essentially it was cooling in function, surcharging the organism with its own humidity: it might best be interpreted as the effect of the intracellular fluids that regulate the chemical metabolism at cell surfaces. Finally came the *rasa* or lymph chyle, exercising a soothing effect upon the entire organism and contributing to an increased formation of blood and vitality.

The loss of *vaya* is followed by diseases marked by 'anguor and unconsciousness; the loss of *pitta* by impairment of the body heat, digestive disturbances and jaundice; the loss of the *kafa* by dryness, burning fever, thirst, insomnia and febrile disturbances.

Accordingly, diets in disease should be so directed as to contribute to the *dosha* concerned with the disease in question. They could be classified as follows:—

(1) Those acting on the *vaya*, or nervous system. Thus most kinds of fish, which corresponded to the Western idea that fish contained much phosphorus. Nuts, the seeds of such plants as melons, pumpkins and cucumbers are good. The flesh of the pigeon is recommended for facial paralysis. On the other hand, substances which decrease the *vaya*, such as tea, opium, *Cannabis indica*, coffee and walnuts, should be avoided, or only used as brain sedatives at the end of a long and arduous tropical day.

(2) Those acting on the *pitta*, or digestion. Such articles as radishes and cucumbers; the various *dāls*, especially when unhusked, and the coarser varieties as *kesari* and *arrāh*, to stimulate digestion. To correct indigestion articles which decrease the *pitta*, such as ginger, cloves, cardamoms and asafoetida.

(3) Finally, those acting on the *kafa*. Articles which increase it are innocuous foods, such as milk, ghee, water and honey. Unfortunately the misinterpretation of the *kafa* as phlegm—which is not Susruta's original teaching at all—has led to the taboo of articles which increase the *kafa* in all respiratory diseases with increased expectoration; thus milk is tabooed in all respiratory diseases, including bronchitis and phthisis. On the other hand, Western Medicine regards milk as an invaluable source of nutrition in phthisis. Great attention is paid in India to articles which increase the *kafa* and are aphrodisiac; such as the milk of the camel, the flesh of the pigeon and sparrow, ghee, honey, *ghur*, various wines, and the pistachio nut. Articles of diet which decrease the *kafa* and should be used in febrile, asthenic states are drinks of the lime, lemon, tamarind, etc.; the diluted products of milk,—such as whey, milk and water, diluted curds, orange juice and pomegranate juice, sugar-cane as sherbet. Wives who are separated from their husbands are advised to take coriander, in order to remain sexually faithful during their absence. In any catarrhal conditions, such as bronchitis or coryza, all acid and sour articles should be forbidden.

Turning to various invalid diets, rice is partaken of as:—*Gruel*, 1 part of fried rice to 19 of water,—*koi*; *peya*, 1 part of fried rice in 11 of water, boiled until the grains are dissolved; *vilepi*, 1 part of fried rice to 9 of water, boiled until dissolved, and then strained. (The use of indivisible or magic numbers for the dilutions,—such as 19 and 11 deserve notice.). Barley is taken as gruel mixed with sugar-candy, and lime juice added. Pulses are taken as soups, 1 part to 19 of water, boiled till dissolved, and flavoured with ghee, salt, coriander or black pepper. Such a soup is demulcent and is much used in diarrhoea. Meat extracts were made much as in Western medicine, but flavoured with fennel seeds and black pepper. *Suji chappaties* of wheat are much partaken of in the Punjab, and are said to be easily digestible. During convalescence boiled *koi* and old *sabi* rice were much favoured.

Turning to the applications of these diets in different diseases:—

(1) In *fevers* where the *kofo* is affected, the main line of treatment is fasting then to give sherbets, pomegranate juice, grapes, various gruels of rice, fish soups, and finally old *sabi* rice. In Northern India lime juice, gram soup and *suji chappolies* are largely used.

(2) In *nervous* diseases, when the *vayo* is affected, as in epilepsy, etc., fish is given as soup, cooked fish heads, curry: also almonds, pumpkin seeds, and cucumber seeds.

(3) In *dysentery* and *diarrhœa*, the patient, if not too weak, is first made to fast, and then given gruels of barley or fried rice, flavoured with coriander or ginger, pomegranate juice, and *ysufgul*. As convalescence sets in, fine old rice, *dâls*, curries of fish or brinjal vegetables are given; but spices and oil are cut down to a minimum. Goat's milk was sometimes used, and soups made from the flesh of young animals without spices. Milk—being considered to be a laxative—was prohibited. The apple and quince were freely used, and are regarded as constipating,—in contradistinction to Western ideas.

(4) In *constipation* green vegetables, the coarser *dâls*, and fruits—except apples and quinces—are indicated. Meat and rice, being constipating, are cut down to a minimum; whilst a favourite prescription is a glassful of milk taken the last thing at night.

(5) In *indigestion* milk, especially unboiled goat's milk, curdled milk, *kidgeri* and wheaten *chappolies* are given. Ghee, meat, coarser pulses, honey and wine are prohibited.

(6) In any disease associated with *cough*, milk, ghee, rice, and all sour or acid substances are prohibited. Instead, meat,—especially goat's flesh,—eggs, *dâls*, *chappolies* and such drying substances as tea and coffee are recommended.

(7) *Cholera* is usually attributed to drinking water whilst partaking of such raw fruits as melon and cucumber. All food is stopped, and a decoction of aniseed, cinnamon and cardamoms is given,—(rather recalling Dr. Tomb's "essential oils" mixture). If collapse supervenes raisin or date infusions are given.

(8) In *leprosy*—(with which all varieties of leucoderma and some other skin diseases are confused)—fish, oils for cooking, new rice, meats, onions, garlic, chillies, alcohol, curds, sour articles and sweets are prohibited. Diet should consist of old rice, pulses as *dâls*, bitter curries, green plantain shoots, young neem leaves, and leaves of *punarnava* (*Borhoavio diffusa*). Soaked gram, wheaten cakes and vegetable curries are permissible. Everything should be cooked in ghee, and as much ghee as possible taken.

In conclusion, the author hoped that he had presented an impartial and unbiased exposition of the subject. These ideas were those held by the common people, based upon the sound principle of experience. He had not criticised the *tridosho* theory, but had merely tried to explain its tenets. The Indian patient always asked for detailed instructions with regard to his diet, and it was essential for the medical practitioner in this country to be familiar with his dietary customs and habits.

In thanking Major Acton for his paper on behalf of the Society, Major R. Knowles, I.M.S., spoke of the keen interest which the late Sir Pardee Lukis, I.M.S., had always shewn in the subject. It was one in which we were profoundly ignorant, yet the second question which every Indian patient asked was with regard to his diet. Hegner had recently shewn that a change from a mixed or vegetarian diet to a carnivorous one might eradicate infections with intestinal flagellate protozoa; whilst Castellani considered rhubarb almost a specific for bacillary dysentery in young children. A curious custom which he had observed among the Khasis in the Khasia and Jaintia Hills was to embalm their deceased

chiefs in honey. It was stated that the honey was subsequently extracted and sold, and that the longer it had been in contact with the dead chief, the higher the price which it fetched and the higher its nutritive quality was supposed to be.

Dr. U. P. Basu said that our knowledge of the subject was exceedingly scanty. There were but few written records, knowledge being rather hereditarily handed down from one generation to the next. Certain possible diets were curiously neglected by Bengalis. On the other hand, *moari* and *koi* rice preparations were valued for their sleep-inducing properties in the aged. Milk was in general a substitute for meat, but since the development of present-day urban conditions, and the giving up of Hindu households of their milch cow, milk had become a source of disease, rather than of health. "Every Hindu his own cow" would not be a bad motto.

In reply, Major Acton thanked Dr. Basu for his interesting suggestions. With regard to milk adulteration in India, it was practised on an almost incredible and widespread or universal scale. As Health Officer of Simla he had found that cow or buffalo milk was customarily diluted with three parts of (clean or dirty) water.

Antimony Salts in the Treatment of Leprosy.

In the *Bulletin de la Societe de Pathologie Exotique*, No. 9, 1924, Tonrrier describes the use of antimony salts by the mouth in the treatment of leprosy. The salt used is "kermes" in doses of one-third to half a centigram in watery solution daily by the mouth. Slight nausea was noted in one of the two cases, but no vomiting nor other sign of intolerance of the drug. Marked improvement was noted in both cases within a fortnight to six weeks, and in a comparatively short time all signs of active disease had disappeared. Both of these cases were of early nodular leprosy. In two other cases of nerve leprosy the same treatment was used, but in addition a course of injections of novarsenobenzol was given intravenously and the results were excellent. Courses of treatment of about two months are advised with periods of rest of about three weeks. The extreme simplicity of the treatment and its freedom from risks of all kinds are accentuated by the author who pleads for a trial in leprosy asylums. He points out that the treatment can readily be combined with the usual treatment by ethyl esters of chaulmoogra oil.

Even taking into account the well known natural tendency for the disease to undergo spontaneous amelioration it would seem to be desirable to give the method a further trial as there are many victims of the disease who are unable to obtain skilled modern treatment to whom an inexpensive drug like kermes would be a great boon if it were found to be effective.

The Aetiology of Sandfly Fever.

WHITTINGHAM makes an interesting contribution to our knowledge of sandfly fever in the *R. A. M. C. Journal* of March 1925.

He defines sandfly fever as an acute specific fever caused by a virus, possibly a leptospira, conveyed to man by the bite of a sandfly. The incubation period is about five days. The disease is characterised by fever of about 3 days' duration, flushed face, suffused eyes, pains in the back and legs and severe frontal headache. Doerr showed that the blood of man is infective only on the first day of the disease. Spirochetes have been reported:—(1) By Convy in cases of dengue in Beirut in 1921. (2) By Whittingham in cases of sandfly fever in Malta in 1921. (3) By Vervoot and Van de Velde

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in cases of 3 to 5 days types of fever in the Dutch East Indies in 1922. The leptospira found by Wittingham was obtained by blood cultures in Wenyon-Noguchii medium. Morphologically it was indistinguishable from *Leptospira icterohæmorrhagica*, but it was not pathogenic to guinea-pigs. This is a point of doubtful significance as spirochaetes are liable to lose their virulence when cultivated.

Wittingham then raises a most important point which has already been emphasized by Lieutenant-Colonel J. W. D. Megaw, I.M.S., in a paper in the *Indian Medical Gazette* of September, 1923: "Were all the cases investigated at Malta, true cases of sandfly fever?"

Wittingham's points are that sandfly fever varies very much from year to year, and he says that "it is possible that the leptospira isolated was a modified form of that which causes epidemic jaundice modified by passage and perhaps atmospheric condition."

Colonel Megaw's comments on this question were:—"Two independent workers (Convy and Wittingham) have found evidence of spirochætal infection, the one in a disease which he regards as dengue, the other in a disease which he classes as sandfly fever. But a comparison of the charts and descriptions shows that they were dealing with the same disease. The duration of the fever in the great majority of cases in which spirochaetes were isolated shows that it differs in a marked degree from previously observed cases of dengue and sandfly fever. These fevers last less than 8 days in 99 per cent. of all cases while the cases of Convy and Wittingham lasted as a rule 11 or 12 days." The occurrence of jaundice in some, and the duration of the fever indicate that the disease is a special type of dengue, showing a distinct suggestion of relationship to infective jaundice, the parasite of which is very similar to spirochæte cultivated by Wittingham.

He also pointed out that the disease cycle in Convy and Wittingham's fever was of 9 to 10 days against 4 to 5 days in the case of dengue and sandfly fever.

It is very important that the true nature of this fever should be established, but one thing is certain, it is quite wrong to assume that it is either dengue or sandfly fever. It is much more likely that it is a closely-related disease with affinities to infective jaundice. The whole subject of the dengue group of fevers needs to be worked out in a systematic manner, and if success is to be attained the workers must divest themselves of preconceived ideas such as have so seriously hindered work on the subject in the past. One of these is that any school-boy ought to know how to distinguish between dengue and sandfly fever; another is that as a stegomyia has been proved to carry the virus of dengue and a phlebotomus the virus of sandfly fever, there is no need to consider the possibility of other insect vectors in either case.

A point which remains to be settled is the difference, if any, between the virus of dengue and sandfly fever. Another is the nature of the spirochaetes which have been found in some short fevers by Convy, Wittingham and the Dutch observers. If these are true spirochaetes it is likely that the fevers belong to the infective jaundice group, as the skilled and persistent search of Major Knowles, Dr. Chandler and many other observers has failed to reveal any spirochæte in true cases of dengue. He does not suggest that the spirochæte has been excluded as the possible cause of dengue and sandfly fever, but if a spirochæte be the cause of these diseases, it is not likely to be the one discovered by Convy and Wittingham. The suggestion of Wittingham that his cases may not have been sandfly fever is one of great importance. Coming from him it will have much greater weight than an opinion expressed by a critic of his work. The dengue-sandfly-fever group still remains one of the most interesting elusives of the unsolved problems of tropical medicine.

Reviews.

A TEXT-BOOK OF PRACTICAL THERAPEUTICS.—By Hobart Amory Hare, B.Sc., M.D., LL.D. Nineteenth Edition, 1925. London: Henry Kimpton. Pp. 1061. Price 36s. net.

THIS well-known book has reached its 19th edition and therefore, needs no introduction to our readers. Many additions have been made in the text and the book has been brought thoroughly up to date and it is certain that this new edition will achieve as great a degree of popularity as its predecessors.

The more modern forms of therapy are fully discussed and the practitioner who consults the volume has the assurance that he will be helped to treat his patient "quickly, safely and with comfort."

Excellent illustrations embellish the volume.

THE PRACTICE OF PEDIATRICS.—By Charles Gilmore Kerley and Gaylord Willis Graves. Third Edition. London and Philadelphia: W. B. Saunders Co., Ltd. Pp. 922. Illustrations 150. Price, Cloth 45s. net.

THIS is the third edition of a book which has been reprinted seven times during the past ten years and which therefore has become an established favourite in America. The reasons for its popularity are evident, it is modern but not too modern, it is comprehensive without being encyclopædic, and it caters for the general practitioner rather than for the specialist. Many of the newer text-books are written by a number of experts each of whom presents a subject from his own point of view and in consequence the broader aspects are lost sight of. Dr. Kerley and Dr. Graves are well acquainted with the modern developments in connection with children's diseases, but they interpret these in such a manner that the general practitioner can make use of them in his every day work. The articles on nutrition, infant feeding and the care of the infant are particularly helpful; they are both scientific and practical. It is impossible to review in detail a book which covers the whole range of medicine, but it may be said that there are few subjects with regard to which the medical man will not obtain help and guidance. Of special value are the illustrative cases which are recorded and the numerous excellent prescriptions which are given. The book altogether is one which can be heartily recommended to the doctor and the advanced student.

PEDIATRICS, VOL. IV.—By various authors. Edited by Isaac A. Abt, M.D. London and Philadelphia: W. B. Saunders Co., Ltd. Pp. 1271. Illustrations 218. Price, £2 5s. net.

THIS fourth volume of Abt's Pediatrics maintains the same high standard as its predecessors. It deals with diseases of the circulatory system, ductless glands and kidneys.

It is essentially a work of reference and in no sense a text-book, but the medical man who seeks for help in dealing with one of the many ailments of children will find in its pages the information which he would seek in vain in one of the smaller books. No less than 26 specialists are concerned in the production of this volume and all of them are American.

It is doubtful whether any other country in the world could produce such a work under present conditions; it is certain that there is no single medical man who is competent to write a detailed review of the numerous articles which it contains.

Every large medical library and every specialist on children's diseases will be forced to buy this large and expensive work, the average general practitioner will find it beyond his means to buy it and beyond his energy to study the nine thousand odd pages which go to make up the complete work.

We can only express our mingled admiration and awe at the degree to which specialism has extended in

America. We in this country must be contented to pick up the crumbs which fall from the tables of our more advanced fellow practitioners in another country.

PEDIATRICS, VOL. V.—By various authors. Edited by Isaac A. Abt, M.D. London and Philadelphia: W. B. Saunders Co., Ltd. Pp. 865. Illustrations 373. Price, £2 5s. net.

THE fifth volume has also been received. There are 24 contributors of whom several are well known in the field of tropical medicine. Dr. Victor Heiser contributes a short article on plague, Dr. Carter writes on yellow fever and Drs. Kraus and Mitchell have an excellent chapter on malaria. The chapters on tropical diseases are good, though in some cases inadequate for workers in the tropics. The rest of the volume deals with orthopaedic surgery, tuberculosis, hereditary syphilis and various infections.

COLLECTED PAPERS ON BERI-BERI.—By H. Fraser, M.D., D.P.H., and A. T. Stanten, M.D., M.R.C.P., D.P.H. London: John Bale, Sons and Danielsson, Ltd., 1924. Pp. 103.

THESE papers have already been fully reviewed in the *Indian Medical Gazette*. All those who are interested in beri-beri will be glad to have these classical papers in so convenient a form.

ACUTE INFECTIOUS DISEASES.—By Dr. J. D. Rolleston, M.A., M.D. London: William Heinemann (Medical Books), Ltd., 1925. Pp. 376. Price, 12s. 6d. net.

THIS book embodies the experience of one who has had exceptional opportunities of studying the acute infectious diseases. It will be found thoroughly practical and helpful to those who are engaged in medical practice; from the student's point of view the absence of illustrations and temperature charts detracts very much from its value.

Differential diagnosis is not sufficiently dealt with, and on the whole the book will appeal more to the experienced medical man than to the beginner.

THE ADVANCE OF ORTHOPÆDIC SURGERY.—By A. H. Tubby, C.B., C.M.G. London: H. K. Lewis & Co., Ltd., 1924. Pp. xii plus 144, with 31 illustrations. Price 7s. 6d. net.

MR. Tubby is a past master of the craft of orthopaedic surgery and anything which he may have to say of the present-day work is certain to be interesting. This little book consists of six articles reprinted from the *Clinical Journal*, dealing with the value of modern radiological technique in orthopaedic work, certain recently described conditions, such as Leggs', Köhler's and the Osgood-Schlatter's disease, and static and postural deformities due to asymmetry of limbs or trunk, a branch in which the author's ingenious methods of measurement have thrown light on the origin of the deformities observed. The later chapters deal with the reconstructive surgery of paralysis, arthroplasty—with which operation his own results have been better than those of the majority of surgeons,—and re-education of cripples. The whole forms an interesting series of articles appealing to the surgeon who specialises in this branch.

We noticed an amusing misprint; Professor Putti is represented as belonging to Boulogne instead of to the Italian city which is known the world over for its excellent brand of sausages.

PYE'S SURGICAL HANDICRAFT.—Edited and largely re-written by W. H. Clayton-Greono, C.B.E., F.R.C.S. (Eng.), Surgeon to St. Mary's Hospital. Ninth Edition. Bristol: John Wright & Sons, Ltd., 1924. Pp. 619. Price, 21s. net.

THIS is a book which has for so long held an accepted place in surgical literature that it has passed the stage of being criticised by a reviewer in regard to its scope and utility. It has for many years been a trusted

guide to the house surgeon and young practitioner, and as the years go by and the subject grows, the book tends to increase steadily in size. To the eye it looks only a trifle stouter, but if we mistake not the paper is thinner and the printing closer than of old. The present edition contains in its 619 pages a mass of information which it will take the student a long time to master, yet it cannot be said that it contains any superfluous matter. We are informed in the preface that many alterations and additions have been made, but we are not told where to look, so that without a laborious comparison with the previous edition it is not possible to appraise the changes which the volume has undergone. A few small defects struck us, however. The work of Kanavel on the treatment of palmar supuration has rendered obsolete the methods of treatment here described and the account of the causation of shock is not in accord with modern views. Delayed chloroform poisoning is not mentioned, nor do we find any reference to the immense value of glucose in rectal irrigation, now almost universally used. The few paragraphs on the treatment of gonorrhœa in which injections with a small syringe are advocated, whilst Janet's irrigations are reserved for obstinate cases, is of very doubtful value. In the urological section there are several recommendations with which we disagree; the use of cocaine in the urethra has long been regarded as dangerous and since other equally efficient agents are available, we would prefer to keep to the traditional teaching. The use of a 1 in 40 solution of lysol to cleanse the glans penis would be very painful and is surely an oversight. The Beniqué pattern of urethral sound is now so commonly used that a figure of it should be given.

THESE are small points, however, in a book of such a high general level of excellence and as a set-off it gives us great pleasure to note the admirable articles on the special departments contributed by specialists, particularly that on the teeth by Mr. Bennett, the detailed directions for extraction of the various teeth are the best we remember to have met with in a work of this kind. We have great pleasure in recommending this book to students and practitioners as heartily as ever.

A MANUAL OF DISEASES OF THE NOSE, THROAT AND EAR.—By E. B. Gleason, M.D., LL.D. Fifth Edition. Philadelphia and London: W. B. Saunders Co., 1924. Pp. 660, with 212 illustrations. Price, 20s. net.

THIS fifth edition of an excellent book we welcome with great pleasure.

THIS edition has been enlarged and brought up to date.

DR. Gleason's book is most eminently practical. Methods of examination of the nose, throat and ear are discussed in a clear and practical manner. A description of the anatomy of the parts is followed in each case by a lucid and concise account of the diseases, their diagnosis and treatment. The description of the more common operations is admirable and makes very clear reading.

THE work is well illustrated and a considerable number of the engravings are original or drawn from dissections made by the author. There is also at the end of the book a list of formulas which should be found extremely useful.

THE book is an excellent one to give the student of this special branch of medicine a comprehension of its field and as it is written with exceptional clearness and simplicity, it will prove helpful to the general practitioner and should occupy a useful place in his library.

THE BACTERIOLOGY OF FOOD.—By Cuthbert Dukes, M.D., M.Sc., D.P.H. London: H. K. Lewis & Co., 1925. Pp. x plus 180, with 25 illustrations. Price, 7s. 6d. net.

THIS is an excellent hand-book on food bacteriology in which all available information regarding the subject from the hygienic, medical, agricultural and industrial points of view is collected and combined in one volume.

The chapters on milk and milk products particularly have been very well written and contain all the information which students of public health ought to possess. The whole subject is written in a style very attractive and interesting, and in a way which will appeal not only to students preparing for the University qualifications but also to those of the lay public who take an interest in this all-important subject of food bacteriology.

A slight error has crept in on page 28, on the subject of filtration. It is stated that the water is filtered at the rate of about 1 inch per hour; the usual rate is about 4 inches per hour.

THE USE OF FISH FOR MOSQUITO CONTROL.—Issued by the International Health Board of the Rockefeller Foundation, New York, 1924. Paper-covered brochure of 120 pp., with 65 illustrations.

This admirable brochure should be in the hands of all engaged in anti-malarial campaigns. The book is not on sale, we understand, but is for general distribution to those who may be especially interested in or concerned with such work. Fish as an agent for the control of mosquitoes have been tried in a desultory way on every continent and in many cities, but only in the United States and South America has definite scientific progress been made in the subject. Yet, if a body of water in which mosquitoes breed is permanent, is not chemically polluted, nor obstructed by vegetation, there seems to be no reason why the right kind of fish should not be exceedingly useful in mosquito control. Further, the method is biologically sound, and its effects cumulative, once the fish are acclimatised.

In South America the use of fish against the yellow fever mosquito was a complete success. Here the water containers used were readily accessible, were easily stocked and at all times subject to human control. Similar conditions exist in limited natural areas not too large to be successfully patrolled by men. In the Mississippi it was shewn that in bodies of water cleared of vegetation, properly edged, and amply stocked with the right fish, no mosquito larvæ survived. As a consequence the malaria index went down.

It is emphasised however that floatage and vegetation must be cleared or the fish will be unable to reach the larvæ. Also the importation of fish from other regions has frequently been a failure, not so much from difficulties in transporting them as from their failure to become acclimatised. It is better to use fish indigenous to the region concerned. Experience has shewn that small fish belonging to certain widely distributed families, prominent among which is the top-minnow, are likely to give the best results for *Anopheles* control; for *Stegomyia* control bottom-feeders of various kinds are preferable.

Within limits, perhaps not so narrow as may be supposed, the method is ready to take its place as a recognised auxiliary means of both yellow fever and malaria control.

The chapters in the book deal with biological methods of combating insects, the functions of fish, the requirements of fish as mosquito destroyers, a historical survey of the evolution of the method, and details of fish control in different countries, and the advantages and limitations of the method. At the end is a very complete bibliography of the subject. The work in India of Southwell, Fry, Chandhuri, Sewell and Wilson is described.

AN X-RAY ATLAS OF THE NORMAL AND ABNORMAL STRUCTURES OF THE BODY.—By A. McKendrick, F.R.C.S. (Edin.), D.P.H., F.R.S.E., and C. R. Whittaker, F.R.C.S. (Edin.), F.R.S.E. Edinburgh: E. & S. Livingstone, 1925. Pp. 222. Price, 25s. net. Postage, 9d.

In this atlas, according to the authors, "an attempt has been made to provide a series of radiograms illustrating the normal and abnormal structures of the body, and also the more common injuries and diseases."

A feature of this work is the publication of radio-

grams showing the different appearances presented by an alteration of the focus point, sixty radiograms have thus been allotted to a study of the normal joints and limbs.

The series of skiagrams representing the joints of the limbs is followed by a series representing the condition of the joints at the age of ten years, and giving the dates of the ossification of the epiphyses.

The letterpress and reproduction of skiagrams leave nothing to be desired and reflect great credit on the publishers.

Radiologists and surgeons will find this volume a very valuable addition to their libraries and an extremely useful guide in X-ray diagnosis.

MANUAL OF PSYCHIATRY FOR THE MEDICAL STUDENT AND GENERAL PRACTITIONER.—By Phil E. Bowers, M.S., M.D. London and Philadelphia: W. B. Saunders Co., Ltd. Pp. 365. Price, 18s. net.

THERE is in this book much to commend it, but American laws and methods of dealing with insane and borderline cases differ so widely from those existent in India that as a handy book of reference it can hardly be recommended to the student or practitioner in India. For the legislator, social worker, educationalist and others of that ilk a perusal of its pages, besides being a useful and pleasant means of filling up a leisure hour will provide much food for thought and knowledge which they might usefully apply to the performance of their duties in their various spheres.

In a book of this type it is naturally impossible to deal fully with every aspect of the subject, but one cannot help feeling that a perfect balance has not been maintained throughout. Some chapters are admirable, others leave one with the sense of a task incomplected, while one or two again seem to err on the side of excessive and unnecessary detail.

The classification adopted is a slight modification of that of the American Psychiatric Association and differs very greatly from the official classification in India. This, however, is a matter of small moment really as the clinical entities dealt with in the text are readily recognisable by one with any knowledge of the subject.

It is interesting to see the prominence given by Dr. Bowers to the physical side of such conditions and the importance he attaches to heredity and environment in their production.

His remarks on endocrine therapy are very interesting and practically the same as those quoted on page 14 of the February supplement of the *Indian Medical Gazette*, i.e., he sees great possibilities before it but recognises that further experience is necessary before any definite statement can be made regarding its efficacy.

The book can be thoroughly recommended to those interested in psychiatry or whose activities be in the spheres already indicated.

AIDS TO PSYCHIATRY.—By W. S. Dawson, M.D. (Oxon.), M.R.C.P. (Lond.), D.P.M. London: Baillière, Tindall & Cox, 1924. Pp. viii plus 309. Price, 4s. 6d. net.

THE "Aids to Psychiatry" by Dr. W. S. Dawson, is one of the best of this series. The study of psychology is often neglected in the physiological course, and here we get a very accurate précis of the whole subject. Freud's theory, which is difficult to understand from his own writings, is very ably condensed into nine pages of the book. The modification of this theory by Jung is very accurately and fairly described by the author. We would like to have seen greater stress laid on the neuroses, i.e., actual and psychoneuroses, as regards their causation by endocrine defects which raise the excitability of the nervous system and help in exaggerating the various anxieties and obsessions seen in these mental states. The different types of insanity are well described, and this should be of great use to the practitioner. We would strongly recommend this book

as giving a very fair and accurate picture of these mental states in as short a compass as possible.

GENERAL SYSTEMATIC BACTERIOLOGY.—By R. E. Buchanan, Ph.D. Baltimore: Williams & Wilkins, 1925. English Agents, Messrs. Baillière, Tindall & Cox: London. Pp. 597. Price 30s. net.

THE present volume is the first of a proposed series of monographs in the general field of systematic bacteriology. Systematic bacteriology has two principal aims or functions which are of importance to the teacher and the investigator. The first of these aims is the presentation in graphic form of our present conception of the phylogeny and of the relationship of various groups of bacteria. The second is to give a greater degree of stability to names used for particular groups of organisms and to prevent unnecessary nomenclatural confusion in the literature.

Bacteriologists can be divided into at least two classes; each views the subject from his own particular angle. On the one hand the interest of the botanist centres on the organism itself, its life phenomena and its pedigree, whereas the pathologist, the agricultural chemist, etc., view it from the point of view of the changes which it produces in tissues and other media. Each demands a classification which fits in with his own particular point of view.

The first chapter of the present volume gives a short account of various classifications of bacteria that have from time to time been adopted; from Mueller's classification of the Vermes (1773), which included the bacteria, down to the classification according to Bergey (1923). One cannot help being struck by the absence of the great names familiar to the medical bacteriologist from the headings of these classifications.

The second chapter discusses various codes of nomenclature and the suitability of their application to bacteriological nomenclature, and is concluded with a report of the suggestions and recommendations of the Society of American Bacteriologists with regard to classification and nomenclature.

Chapter III, which constitutes more than two-thirds of the volume is an alphabetical list of the names which have been applied by various authors to designate sub-genera, genera or higher groups of bacteria. One wonders how many volumes would have been occupied had the author treated in the same way the various names applied to species.

The book will prove valuable both to the potential offender and to the unfortunate sufferer in the matter of bacteriological nomenclature; the former will do well to study Chapter II, carefully so that he may not add to the confusion, the existence of which Chapters I and III demonstrate; the latter will find Chapter III extremely useful when he wishes to discover what is really meant by any of the loosely-applied generic names with which the literature abounds.

This volume forms a useful addition to the library of any medical bacteriologist and is almost indispensable to the systematic bacteriologist who wishes to be up to date in the matter of nomenclature.

PATHOGENIC MICRO-ORGANISMS.—By William Hallock Park, M.D., Anna Wessels Williams, M.D., and Charles Krumwiede, M.D. Eighth Edition. London: Baillière, Tindall & Cox, 1925. Pp. x plus 811. Plates 9. Figs. 211. Price 30s. net.

THIS well-known book has been thoroughly revised and brought up-to-date; it is now in its eighth edition. The writers have succeeded in producing a manual which is not merely a collection of facts but is a well-balanced and readable book in which the student and practitioner will find all that is of importance in the science and practice of bacteriology. One says bacteriology, because, although the scope of the book includes the allied sciences,—protozoology and mycology,—it is written by bacteriologists mainly for the use of the bacteriologist and the health officer.

However, the more important protozoa and yeasts have not been neglected.

The book is divided into three parts; the first part deals with the classification and general description of the various groups of pathogenic organisms, with practical laboratory methods and with immunology; the second part, which constitutes about half the book, deals with the known pathogenic organisms; and finally the third part, which is headed "Applied Microbiology," deals with the practical application of the science and includes chapters on such subjects as vaccine and serum therapy, examination of water disinfectants and so forth.

It is in every way an excellent book and one that we can thoroughly recommend both to the laboratory worker and the practitioner; it is also extremely useful as a text-book for the student. The book is printed in large, clear type, on good paper and is freely illustrated with very well reproduced photographs and diagrams.

Annual Reports.

NOTES ON VACCINATION IN THE CENTRAL PROVINCES AND BERAR FOR THE YEAR 1923-24. BY LT.-COL. T. G. N. STOKES, M.B., I.M.S. NAGPUR: GOVERNMENT PRESS, 1924. PRICE RE. 1.

THERE were 37 assistant superintendents of vaccination and 301 vaccinators on duty during the year in this province; the total number of vaccinations performed being 5,01,398 as against 4,29,291 in the previous year. Colonel Stokes notes, however, that large numbers of unprotected children are still to be found both in municipal towns and villages, and that the number of operations performed by individual vaccinators is still, in general, far below the standard. Now that the district councils and local boards have shouldered the responsibility for the work, matters may improve. The number of re-vaccinations, was unsatisfactory, and in spite of a government press communiqué and in face of a considerable amount of small-pox, the state of affairs with reference to re-vaccination is bad. A villager assaulted a vaccinator in one district but was acquitted on trial, principally because vaccination is not compulsory under the law. Two other vaccinators were recently assaulted whilst in the execution of their duty, and one such case is still on trial. Colonel Stokes comments that if vaccinators can be obstructed in the performance of their important duties with impunity, matters are not likely to improve. The civil surgeon of Amraoti reports that in the village of Sirasgaon not one child was vaccinated during the year, but fails to give the reason for this. Report after report emphasises the necessity for compulsory vaccination, and proposals for the introduction of compulsory vaccination in rural areas are now under the consideration of government.

The cost of the department during the year was Rs. 1,96,210, the average cost of each successful vaccination being Rs. 0-6-10. The glycerinated lymph issued from the institute at Nagpur continued to be satisfactory; 185 calves were operated on during the year and 6,450 grammes of lymph obtained equivalent to 5,60,480 doses. In primary vaccinations the insertion success rate is reported to have been 92 per cent. as against a figure of 48 per cent. for re-vaccination. The number of deaths recorded from small-pox during the year was 420, but Colonel Stokes considers that this does not represent the true state of affairs, since several reports state that the disease has made serious havoc in different districts. "It will be seen" he writes, "that vaccination work is being neglected both in municipal towns and rural areas, mainly owing to the apathy and indifference

of the local bodies. As this is the fifth year since the last big epidemic of small-pox and there is every likelihood of the disease assuming serious proportions, I would very strongly urge these bodies to adopt drastic measures." The suggestion made to train schoolmasters as vaccinators is an impossible one, whilst no advantage would be gained by handing over the work in municipal areas to dispensary assistant medical officers. Apparently the Central Provinces are waiting for the next big epidemic before their local and municipal authorities really set their house in order.

ANNUAL RETURN ON VACCINATION, BIHAR AND ORISSA, FOR THE YEAR 1923-24. By LT.-COL. W. C. ROSS, M.B., CH.B., D.P.H., I.M.S. PATNA: SUPDT., GOVT. PRINTING, BIHAR AND ORISSA, 1924. PRICE 10 ANNAS.

It is curious how unanimous are all recent vaccination reports from different provinces. "I do not consider," writes Colonel Ross, "that small-pox can be effectively dealt with and stamped out unless vaccination is made compulsory throughout the Province, and I would recommend that the Vaccination Act should be modified so as to extend the age within which vaccination is required to one year, and should be generally enforced; also that vaccination should be free." This summarises the situation—as far as we can gather—for every province in India. In a "successful" year at present in any province in India the number of persons vaccinated is about 23 per mille, which is considerably below the average birth rate of about 38 to 39 per mille. As a result the Indian population is becoming year by year less protected against small-pox, and the experiences of at least Bengal and Bihar and Orissa in 1924-25 are that epidemic small-pox is increasing. The present Acts are unsatisfactory in many ways; in report after report it is suggested that vaccination should be made compulsory, at least in the rural areas, whereas it is now voluntary. Further, the Indian parent is averse to having his child vaccinated under the age of six months, and many different Directors of Public Health in the Provinces suggest that this difficulty can be easily met by raising the age within which vaccination should be enforced, to one year. We read in several reports that such matters are "under the consideration of government"; we trust that this does not mean that decision will be deferred to the Greek calends; otherwise small-pox may soon take the place which epidemic plague now holds in India.

The inspecting staff during the year consisted of the Director of Public Health, three Assistant Directors of Public Health, 20 district inspectors and 69 sub-inspectors. In municipalities and in Puri district vaccination was done by paid vaccinators; otherwise vaccination was carried out under the licensing system, except for the employment of paid vaccinators by district boards; and 1,088 licensed and 228 paid vaccinators were on duty during the year. The total number of vaccinations performed was 1,043,264 as against 1,002,889 for the previous year. The success rate was 97.25 per cent. in primary operations in municipalities and 49.94 per cent. in re-vaccinations. It is noted that Patna showed a decrease of over 1,000 vaccinations, whereas in the Native States where both vaccination and re-vaccination are practically compulsory, matters are very satisfactory. During the year the number of children under one year of age available for vaccination was 1,034,163, of whom 3,75,127 were successfully vaccinated. More than half the vaccinations performed are on children of more than one year of age, and civil surgeons and assistant directors of public health are unanimous in attributing the opposition to vaccination of parents more to the age of the child than to the actual operation of vaccination itself.

During the last ten years the deaths from small-pox in the province were 95,628, and Colonel Ross notes the tendency of the disease to recur in cycles

and anticipates a severe epidemic in 1926 or 1927. "The constant and considerable mortality from small-pox," he writes "is, in my opinion, a complete demonstration both of the insufficiency and of the inefficiency of the existing arrangements for vaccination."

The Vaccine Depot at Nankum supplied the province with vaccine lymph throughout the year, and 5,357,025 doses were manufactured, whilst a large reserve supply is in hand. The average cost of the vaccine works out at 0.91 pies on gross expenditure and 0.34 pies on nett expenditure, when receipts are taken into account. During the year adult animals in place of calves were used to some extent to supply the lymph, as they are cheaper in the long run. The cold storage plant gave considerable trouble, and a duplicate engine is required. Experiments were made in the use of 0.05 per cent. iodine added to the lymph to purify it, and were very satisfactory; after plating such treated lymph no bacterial colonies grew. The total cost of the department during the year was Rs. 1,52,980; or 2 annas 4 pies per successful vaccination.

HEALTH DEPARTMENT, CIVIL AND MILITARY STATION, BANGALORE; ADMINISTRATION REPORT FOR 1923-24. POWER PRESS: BANGALORE, 1924.

THIS report by Dr. S. Amritaraj, L.R.C.P. & S., D.P.H., Health Officer, Bangalore forms part of the Municipal Commission, Bangalore's annual report for 1923-24, and tells of continued progress. The birth rate was 38.35 per mille, and slightly lower than in previous years; but the mortality rate, 34.03, showed considerable improvement on the figure of 39.99 for 1922-23. Deaths from tuberculosis numbered 313, and the disease is apparently on the increase in the station; amongst the Mahomedan community it is to be noted that deaths from tuberculosis are four times as common among women as among men, as a result of their close confinement and the purdah system among them. Malaria accounted for 1,628 admissions to hospitals, and the attendance of 12,233 out-patients. Small-pox was also rather prevalent, 182 cases with 52 deaths; but the incidence of plague—84 attacks with 63 deaths—was the lowest recorded for the last 25 years. Infantile mortality for the year was 306.9 per mille, and Dr. Amritaraj comments on the steady rise in price and deterioration in quality of the milk supply; "every year the milk problem is getting more and more acute." How lightly the courts deal with offences under the public health acts is shewn by the fact that in 1,402 prosecutions fines amounting to only Rs. 1,966 were imposed.

Medical inspection of school children was continued throughout the year, and dental caries, nasal catarrh and chronic bronchitis figure largely in the returns received. Antirabic treatment was given by the Health Officer to 65 persons, of whom one died, a child severely bitten in the lip. The chief public health event of the year was National Baby Week in January 1924, which was very successful. The maternity and child welfare work was expanded during the year; two pre-maternity wards and an emergency labour room were added to the Thimmiah Road centre, and four new welfare centres opened in Fraser town, Knoxet, Shoolay and in the Peninsular Tobacco Co.'s works. The progress of maternity welfare work in Bangalore is shewn by the statement that some 33 per cent. of all births which take place in the station are now attended by qualified midwives, and by the fact that the number of untrained practising *dais* is going steadily down.

ANNUAL REPORT ON THE MEDICAL AND HEALTH DEPARTMENT, MAURITIUS, 1923.

The annual health report of the island of Mauritius, which is so largely an Indian colony, is always of interest. The area of the island is 720 square miles,

and its population 3,81,678, its density being very high, some 530 persons per square mile.

The birth rate for the year was 36.8 per mille, and the death rate only 28.5 per mille as against an average figure of 42 per mille for the preceding quinquennial period. The chief reduction in mortality has been in malaria, which caused only 1,979 deaths in 1923 as against 3,526 in 1922. There can be no doubt that Mauritius is deriving great benefit from the vigorous anti-malarial campaign which was started three years ago by the health authorities and has since been pushed forward unrelentingly. After malaria, the next two principal causes of deaths were pneumonia and broncho-pneumonia, whilst infantile diseases accounted for 1,026 deaths. The infantile mortality rate was 139.4 per mille, a figure greatly below corresponding figures for India. The chief causes of the infantile mortality are venereal diseases, congenital debility, premature births, improper food and methods of feeding. As usual mortality among infants less than one year old was greater among male infants, 1,058 deaths, than amongst females, 877 deaths. During the year the training of midwives was put on an efficient basis, and it was arranged in 1924 to provide Government qualified midwives in every district and township. Four crèches were at work during the year, one of them on the Riche-en-Eau Sugar Estate endowed by the principal owner of the estate.

Hospital and dispensary attendances totalled 82,326. The death rate from malaria was 5.1 per mille as against 8.6 per mille for the quinquennium 1919-23. The spleen index, on an examination of 12,925 school children was 15.6 per cent., and the endemic index on 5,368 children examined, 9.4 per cent. There were 1,192 admissions for influenza with a case mortality, however, of only 4.4 per cent. Dysentery is not a notifiable disease, but caused 379 admissions with a case mortality of 6.3 per cent. Leprosy is also not a notifiable disease, although lepers are numerous in the island, and there were only 37 inmates in the St. Lazare leper asylum. Moogrol and "Oscol" stibium are on trial in treatment. Plague, which was introduced into the island in 1899, caused 118 deaths in 1923, and was endemic all the year round in Port Louis. Despite a vigorous rat campaign, and the destruction of 83,361 rats during the year, it is impossible to exterminate plague in the island; there are many dilapidated old wooden buildings, much overcrowding, insanitation and rat-ridden grain godowns. Educational propaganda is called for, and cinema films dealing with malaria, flies and rats have been ordered. The housing question is acute, and many of the recently erected houses do not satisfy the minimum health requirements: "housing in Port Louis and its suburbs, in populous towns, villages and hamlets is absolutely wretched." A good start has been made under Sir Hesketh Bell, at the model village at Cassis. The construction of this village has provided a mine of information with regard to the best type of materials to be employed in such work. There are 121 model cottages and lodges with 460 inmates.

Cancer accounted for 87 admissions to hospital with 9 deaths. The venereal disease problem is a very serious one, as most cases are concealed, and it is proposed to open a special venereal clinic in the near future. The mortality among women in childbirth is 16.4 per thousand live births,—a regrettably high figure due to dirt and ignorance. The commencement of a new midwifery and child welfare society, however, may improve matters. Pulmonary tuberculosis accounted for 959 admissions and other forms of tuberculosis for 979; and it is hoped to shortly make the disease notifiable, when some measure of its actual incidence in the island will be obtained. The number of persons certified insane was 708, and there were 194 admissions to the lunatic asylum. At the port of Port Louis, 203 sailing craft and 30 steamers were dealt with during the year by the health authorities. Improvements in the hospitals include bringing the Civil Hospital radium and

X-ray plant up to date and also purchasing an X-ray plant for the Victoria Hospital.

The water-supply in some of the districts is good, but in others is bad or inadequate. That of Port Louis is largely derived from Grand River North West and Bathurst Canal, and both these sources of supply are unfit and unsafe. A chlorination plant has been installed at the former, and it is hoped to replace the crude, impure water which 95 per cent. of the inhabitants at present drink by filtered, chlorinated water. Piped supplies are being introduced in many of the country districts.

The milk supply is unsatisfactory; milch cows have been imported by government, and up-to-date stables erected at Curepipe; the supply sent to the Victoria Civil Hospitals being good. A scheme for a central milk distribution centre and a supply of pasteurised milk is being considered.

Dr. T. H. Gilchrist's main report is supplemented by several interesting subsidiary reports. Dr. C. H. Yeager reports on the hookworm campaign. Special measures were taken in Moka district. The general infestation rate was 62.5 per cent., and Rs. 29,702 was spent on the campaign during the year, 12,540 persons being treated. Up to the end of the year 5,780 pit latrines had been constructed in the island; 55 lectures were delivered to audiences totalling 8,840, and the cinema film "Unhooking the hookworm" has been ordered.

Dr. J. B. Kirk contributes a special review of health conditions in Port Louis. The death rate, 34.1 per mille, shews a marked improvement on the figure of 42.6 per mille for 1922. The year saw the entire re-organisation of the sanitary staff, a new special anti-malaria department being created, and special classes of instruction held. Government took over night soil conservancy from the Roche Bois Manure Co.; a policy of efficient removal on alternate days was found to be more satisfactory in results than to attempt a daily service with an insufficient staff. The scavenging of the town is still unsatisfactory, as most of the garbage is burnt in the open. A special type of fly-proof latrine was introduced, and a regular supply arranged for with a government contractor; the regular supply of latrines of this pattern to householders and business firms has been commenced. In the extra-urban area pit latrines are being introduced. Anti-malarial measures were conducted vigorously throughout the year; in this connection it is interesting to note that Mauritius is unlucky enough to have not only *A. culicifacies* and *A. maculipalpis*, but also *A. costalis*, the great malarial carrier of Africa. Cactus clearing forms an important part of the anti-malarial measures. In anti-plague measures 6,029 persons were inoculated and a beginning made of rat-proofing of houses in the town. In one instance where premises were fumigated by burning sulphur in open burners in a shop, it was found that rat fleas had remained unaffected, and the technique of fumigation has had to be revised and improved. "Glue boards" have been found useful in the anti-rat campaign; these boards catch not only the rats but their fleas as well. They were introduced by Dr. Balfour and are coated with a varnish made from linseed oil and resin.

Of the state of the central market in Port Louis, Dr. Kirk writes in a strain of despair.—The place is haunted by many dogs, though fortunately Mauritius is so far free from rabies. The meat market is so bad that nothing less than its complete reconstruction would make it satisfactory. "Taken as a whole the central market of Port Louis is of no credit to the municipal corporation, either from a hygienic or aesthetic point of view . . . the subsidiary markets reflect faithfully all the insanitary features of the central market, but on a smaller scale." Some thousands of kilos of foodstuffs were seized by the sanitary authorities as unfit for consumption and either burnt or dumped into the sea. The milk supply is bad and has given the department constant anxiety. (One of the most curious features of Indian life is that the ordinary householder should prefer to buy one part of milk

diluted with three parts of dirty water at about 6 seers to the rupee, rather than pure milk without water at 3 seers to the rupee). Anything up to 60 per cent. of samples analysed were found to be "sophisticated." A test case was taken into court against one milk vendor, who was fined, but no improvement followed.

In the report on school medical inspection, Dr. F. L. Keisler notes that there has been marked improvement in malaria incidence, and also in hookworm infestation. Most of the schools, however, are old converted private residences and not really suitable in construction. Scabies is rather prevalent and measures should be taken to segregate infected children.

The bacteriological laboratory under Dr. L. G. Barbeau records a year of heavy routine work. A case of intestinal coccidiosis was encountered during the year, the oöcysts in the faeces being apparently those of *Isospora hominis*; 385 samples of foodstuffs were chemically analysed, also 189 specimens in connection with medico-legal work.

ANNUAL REPORT OF THE GOVERNMENT CINCHONA PLANTATIONS AND FACTORY IN BENGAL FOR THE YEAR 1923-24. BY C. C. CALDER, OFFICIATING SUPERINTENDENT. CALCUTTA: BENGAL SECRETARIAT BOOK DEPOT, 1924. PRICE 7 ANNAS.

THE year was more or less a normal one, and though the rainfall at Mungpoo was defective for the second year in succession, improved methods of cultivation have kept up the yield of cinchona. All extensions at Mungpoo have been planted on narrow contour terraces, and with improved methods of manuring and shading it has now proved possible to cultivate cinchona on slopes. Only sufficient plantation bark to meet provincial requirements was put through the factory, the balance required being taken from imperial stocks of Java origin. The present bark agreement does not terminate until 1928, hence only the minimum amount of local bark is being cropped. The factory is capable of turning out 55,000 lbs. annually, but with the shortage of water-supply during the year could only be run for 250 days.

The quinine used in India under present conditions is but a fraction of what could be usefully and remuneratively employed, yet in spite of this the accumulated stocks are insufficient for any all-India intensive anti-malarial campaign. Reports of a world shortage of quinine, which have frequently appeared in the press, fail to distinguish between an actual shortage of supply and a shortage of purchasing power. At present the supply is in excess of the demand. "Prices are still largely under the control of the quinine ring . . . many people simply do without quinine . . . the hoped-for fall in price has not materialised."

At Mungpoo the acreage under cultivation was increased by 150 acres, whilst 113 acres were cut, giving a yield of 2,15,366 lbs. At the end of the year there were 937 acres under cultivation. At Rungbee a young plantation, the result of the selection of a high grade tree for planting, promises to give a species with a high quinine yield,—much better than what is obtained with imported Java seed. At Munsong a hailstorm caused considerable but fortunately localised damage. 140 new acres were planted and 148 acres cut, giving a yield of 4,36,086 lbs. The total acreage at both plantations works out at 3,055 acres.

At the factory the total production of quinine sulphate, both provincial and imperial, was 43,264 lbs., and the total of all products 56,822 lbs. The average cost per lb. taken over a series of years was 3.6 annas for Mungpoo bark and 2.7 annas for Munsong bark. The year's expenditure for both plantations was Rs. 2,09,697, but the actual cost of the harvests was Rs. 1,28,296 as against quinine and similar products manufactured worth Rs. 4,99,395 at the present market rate of Rs. 26

per lb. The amount of cinchona febrifuge sold was 12,478 lbs. and the selling rate from Rs. 8 to Rs. 10 per lb. At the end of the year 3,55,081 lbs. of bark were in hand requiring to be worked up.

In addition to cinchona, about 47,500 ipecacuanha plants were raised from seed for planting in a new nursery placed some 500 feet higher than the old beds, in the hope of avoiding the evil effects of excessive daily fluctuations of temperature on the plants. Already 3 lbs. of emetine have been extracted, and this Indian emetine is now on trial. The cultivation of digitalis is also being continued.

THE ROCKEFELLER FOUNDATION. ANNUAL REPORT FOR 1923: NEW YORK, 1924.

THIS report like its predecessors fills us with admiration tinged with envy, especially in the section which deals with medical education. The bountiful aid which is given to China for the purpose of developing medical education has been continued and this will doubtless bear excellent and abundant fruit in the course of time. Up till now the atmosphere which is needed is still lacking in China and it has been necessary to carry out a campaign for the purpose of educating Chinese students in an appreciation of the value of modern scientific medicine. There are only 53 students at the magnificent and lavishly-equipped Peking Union Medical College.

If only the eyes of the Division of Medical Education would turn towards India and realise the vast needs of this country for a campaign of improvement in medical education there might be wonderful results which could be obtained in a few years instead of the decades which will be needed in the case of China.

The activities of the International Health Board are vast, but here again India is left comparatively in the cold. Can it be that India is supposed to be in less need of help than other countries? Or is it that the Government of India is too proud to appeal for a share of the bounties which are extended to other parts of the world?

Whatever be the cause it is earnestly to be hoped that the Rockefeller Institute will be induced to extend its activities to India not merely in the interests of this country but also because there are good reasons to believe that the conditions for solving the remaining great problems of disease are more favourable in India than in any other country in the world.

Not only is there a great wealth of material, but also there is a large number of well-trained medical men who are capable of taking part in the work of research.

KASHMIR C. M. S. MISSION AND KASHMIR STATE LEPER HOSPITAL. ANNUAL REPORTS FOR 1924. MYSORE: WESLEYAN MISSION PRESS, 1925. PRICE 4 ANNAS.

THE work of the celebrated mission hospital at Srinagar continues to increase, and the year saw 37,151 attendances in the out-patient department, 1,994 in-patients and 5,501 surgical operations. Lady Reading, in a note made after her visit to the hospital in October, speaks of "the efficiency of the arrangements and the splendid work done by Dr. Neve and his staff." Not only is there a large volume of work done at the hospital; medical aid is also taken into the villages, where from exposure to cold and wet, and of digestive disorders owing to a diet consisting almost entirely of rice and Indian corn.

During the year no less than 496 operations were performed for entropion and trichiasis. Pulmonary tuberculosis, once very rare in Kashmir, is now rampant, and the problem is one which demands vigorous State action. Surgical tuberculosis is also very common; there were 73 operations for tubercular glands and most of the amputations were for septic tuberculous joint

disease. Appendicitis, Dr. Neve notes, is uncommon, cancers—except for *kangri*-burn carcinoma—are rare, but sarcomata relatively common. The small number of injury cases dealt with is due to the absence of factories, railways, etc.; but 17 cases of persons mauled by bears were admitted. In the late autumn an outbreak of cholera in the west end of the valley constituted a menace to the health of the whole valley; and there were more than a hundred cases with a 70 per cent. mortality.

Financially the hospital ended the year with a deficit. Owing to Dr. Vosper's transfer to Peshawar the proceeds of a large private practice, first instituted by Dr. E. Neve and later carried on by Dr. Vosper, which are all given to the support of the hospital, were lost. Also the creation by the State of a Directorship of Medical Services and of a whole-time residency surgeoncy will deprive the hospital of another Rs. 2,500 per annum. Rs. 10,300 had to be withdrawn from invested funds. We trust that philanthropists will not be slow in recognising the needs and claims of Dr. Neve's splendid work.

In the leper hospital, which is under the State, there were 215 in-patients during the year, whilst a grant of Rs. 25,000 has been obtained for the building of a new children's home, which will house segregated children. In former times the outlook with regard to the treatment of leprosy was exceedingly gloomy. To-day, Dr. Neve wonders whether the pendulum has not swung too much the other way; in early cases the use of the ethyl esters will lead to improvement and even cure, but in advanced cases the results are slow and the treatment tedious and prolonged.

Both reports are illustrated by excellent photographs, and we must congratulate Dr. Neve on their production.

Correspondence.

"RENDER UNTO CÆSAR THAT WHICH IS CÆSAR'S."

To the Editor, "THE INDIAN MEDICAL GAZETTE."

SIR,—Will you permit me to say a word anent the bamboo clamp in intestinal surgery which Mr. Moses speaks of on p. 194 of your April number?

It is many years ago—I cannot be precise about the date—that I read in your journal an illustrated article by Lieutenant-Colonel F. P. Connor, I.M.S., Professor of Surgery at the Calcutta Medical College, on this subject, I think, recommending the bamboo clamp as a superior instrument to the usual metal one.

I do not wish to depreciate Mr. Moses' claim to originality or resourcefulness, but the biblical heading of this short note explains my motive.—Yours, etc.,

B. J. BOUCHE,
Assistant Surgeon, I.M.D.

JUTOGH, SIMLA HILLS,
15th April, 1925.

PUBLIC HEALTH ORGANISATION.

To the Editor, "THE INDIAN MEDICAL GAZETTE."

SIR,—Anent Major Russell's letter contradicting your statement to the effect that in the appointment of District Health officers Bengal has given the lead to the whole of India, and claiming the credit for Madras, I would like to point out that the District Board of Burdwan in Bengal was the first to appoint me as their Health Officer in May 1918. I believe the District Board of Howrah appointed a Health Officer the next year and by 1921, when the Madras scheme had perhaps been sanctioned, most of—if not all—the District Boards in Bengal had been staffed with Health Officers.

Major Russell's contention for the lead to Madras therefore falls to the ground.—Yours, etc.,

J. L. DAS, D.P.H.,
Personal Assistant to the Director of Public
Health, Bihar and Orissa.

PATNA,
9th April, 1925.

A CASE FOR DIAGNOSIS.

To the Editor, "THE INDIAN MEDICAL GAZETTE."

SIR,—I thank you for publishing my letter regarding the tragic death of a *vadia*, in course of practice, in your April number.

I now write to you about another case:—A railway man aged about 42 years slept one night in his room, with coal burning in a hearth and the doors and windows closed. At about midnight he felt a desire to pass urine. He got up, opened the door and went out to relieve himself. While going he felt giddy. On returning he became senseless and fell down over the fire burning almost the whole of the right half of his body (from the axilla to the knee joint). He was admitted the next morning (at the end of November, 1924), to the Railway Hospital from where he was sent to the Muzafferpur Sadar Hospital for treatment. The wound became extremely septic but healing commenced under appropriate treatment. The case came under my treatment during the second week in February, 1925. Almost the whole ulcer had healed and I was thinking of discharging the patient when I was suddenly called to see him. He was lying senseless over his bed in a comatose condition, eyes wide open as in coma-vigil, pupils normal, pulse frequent and irregular, no fever, mouth covered with frothy mucus, and breathing stertorous. He got convulsions from head to foot every 15 or 20 minutes lasting for 2 or 3 minutes.

I immediately gave him an injection of digitalin and strychnine, repeating it after half an hour. Little improvement followed. The patient went from bad to worse and finally died in the course of two and a half hours.

When I first saw the case I had the urine examined; neither albumin nor sugar were found. The patient complained of nausea for the last five or six days and had actually vomited the previous night; he also complained of palpitation at midnight. The former I attributed to roundworms and was thinking of giving him a dose of *santonin*; the latter I was informed of when it was too late to do anything.

Would you or your learned readers kindly enlighten me as to what could have been the cause of the patient's death? Is death from uræmia possible so long after the accident of burning?

At the time of death he had an ulcer about the size of a rupee, which was being dressed daily with dusting powder.—Yours, etc.,

S. D. NARAIN, I.M.P.

DHAKA, CHAMPARAN,
18th April, 1925.

POST-GRADUATE WORK IN VIENNA.

To the Editor, "THE INDIAN MEDICAL GAZETTE."

SIR,—I have recently been asked by many medical men in this country for information regarding post-graduate and clinical work in Vienna; and the following information may be useful for those who think of going there, and I shall depict the conditions as I found them at the eye, ear, nose and throat clinics in the latter half of 1924.

The post-graduate work is run by the American Medical Association of Vienna, and a cordial invitation is issued to all English-speaking medical men to join the Association and make use of all the facilities to make their stay both profitable and enjoyable.

JULY, 1925.]

A knowledge of German, whilst not absolutely necessary, is strongly recommended. Practically all the courses are given in English but most profit comes to the men who can speak and write German.

Courses are divided into didactic, clinical and practical, and are arranged and listed in the Association club rooms. Fees for instruction are fixed on a standardised system and run from three to five dollars per hour for lectures or clinical demonstrations and from fifteen to fifty dollars per month for clinical work, depending upon the amount of individual teaching. The numbers for each course are limited, preference being given to those who are longest in Vienna and the fee is divided amongst the men taking the course. Hence some courses work out very cheaply, others more expensively.

The courses given in the ear, nose and throat clinics are excellent, one would not ask for anything better and the teaching is most thorough and practical. I have never seen such perfect anatomical and pathological specimens as are used for demonstration purposes in the Neumann and Hajek clinics.

The eye clinics are also good but do not reach the same high standard as the above.

For the study of refraction I would recommend men to go to Moorfield's Hospital, London, rather than Vienna. Teaching in the use of Gullstrand's Slit Lamp can also be obtained in Vienna, when it could not be got in England, but it does not come up to the standard of the wonderful annual course given by Professor Vogt at Zurich University, Switzerland.

Operation work on the cadaver is plentiful and good in the ear, throat and nose departments but more difficult to obtain in the eye department.

Operation work on the living is only obtained after a prolonged stay at the same clinic unless it can be arranged privately with some surgeon.

To get the best work one ought to remain at least six months in Vienna. Some of the courses are in great demand and it often happens that one has to wait a considerable time to get into these courses as vacancies are filled according to the length of time the applicant has been in Vienna.

Owing to the depreciation and fluctuation of the kronen, the dollar is the popular coinage and all fees are paid in it.

I have only personal knowledge of the eye, ear, nose and throat clinics but Vienna offers unique opportunities for the study of other branches of medicine, in that the large General Hospital, children's hospital, polyclinic, pathological, anatomical and hygiene institutes, where most of the instruction is given, are situated in close proximity to one another and are supplied with an immense amount of clinical material.

Pathological and genito-urinary teaching I have heard are excellent.

Weekly meetings are arranged by the Association and usually the best talent is obtained and the speakers are divided equally between English and German.

Courses start as early as 7 a.m. and go on till 9 p.m. and if one is lucky, it is marvellous how much work one can put in even in a few months.

The summer vacation begins about the 1st of July and lasts until the middle of September. By choice this is not the best time to go to Vienna but it does not interfere greatly with the courses, for nearly all the important ones are carried on by substitutes.

Many people go to Vienna with the impression that living is very cheap on account of the huge inflation of the kronen exchange. But this is a fallacy and is proved by the small number of British people one comes across except those doing medical post-graduate work, and the trend of prices is on the upward grade. Living is more expensive than in France or Italy. The hotels are expensive but one can live reasonably at pensions where prices vary from 50 dollars a month upwards and one can select these on arrival.

Outside of medicine Vienna offers many attractions, there are few other capitals in the world with environs

as charming, and in a very few minutes one can escape from the town and imbibe fresh air in the woods and fields below the spurs of the Carpathians and of the Alps along the banks of the Danube.

The opera, the public buildings and parks will occupy one's remaining spare time.

Nothing can equal the kindness shown to one by the members of the American Association in Vienna. One is made at home at once and the helping hand held out on all sides. It is only right that we in turn should reciprocate when members of the American medical profession visit this land to gain experience in whatever kind of work they are interested.

My advice to members of the profession who contemplate going to Vienna is to go and they will not be disappointed.—Yours, etc.,

E. O'G. KIRWAN, M.B., F.R.C.S.I.,
Major, I.M.S.

BERHAMPTON,
30th April, 1925.

Service Notes.

APPOINTMENTS AND TRANSFERS.

Lieutenant-Colonel N. M. Wilson, I.M.S., made over charge of the duties of Superintendent of the District Jail at Multan to Major M. L. Puri, I.M.S., on the afternoon of the 6th May 1925.

Lieutenant-Colonel J. R. J. Tyrrell, I.M.S., an Agency Surgeon, is posted as Administrative Medical Officer in Central India and Residency Surgeon, Indore, with effect from the 7th May 1925.

Lieutenant-Colonel H. G. Stiles-Webb, I.M.S., Officiating Director of Public Health, Central Provinces, was appointed to hold charge of the current duties of Inspector-General of Civil Hospitals, Central Provinces in addition to his own, with effect from the forenoon of the 13th March 1925 to 29th March 1925 inclusive.

The services of Major H. L. Batra, M.C., I.M.S., are placed permanently at the disposal of the Government of Assam.

Major W. J. Simpson, I.M.S., an Agency Surgeon, is posted as Agency Surgeon in Bhopal, with effect from the 16th March 1925.

Bt. Major W. Ross Stewart, I.M.S., Staff Surgeon, Bangalore, is appointed, in addition to his own duties, to officiate as an Agency Surgeon and is posted as Residency Surgeon, Mysore, during the absence on leave of Lieutenant-Colonel Standage, C.I.E., I.M.S.

Major J. L. Sen, M.C., M.B., I.M.S., is appointed to act as Superintendent, X-Ray Institute, Dehra Dun, with effect from the 14th April 1925.

The services of the following officers of the Indian Medical Service are placed permanently at the disposal of the Government of the Punjab, with effect from the dates noted against their names:—

Major M. L. Puri. Dated the 30th January 1923.

Major A. M. Dick, O.B.E., M.B., F.R.C.S. Dated the 9th February 1923.

Lieutenant-Colonel V. N. Whitmore, O.B.E. Dated the 1st October 1923.

The services of Captains W. J. S. Ingram, M.C., M.B., I.M.S., and M. Murphy, M.C., I.M.S., are placed temporarily at the disposal of the Government of Burma, with effect from the date on which they assume charge of their civil duties.

Captain R. H. Malone, M.D., I.M.S., Acting Assistant Director, Bombay Bacteriological Laboratory, is appointed to act as Director of the Laboratory during the absence on leave of Lieutenant-Colonel F. P. Mackie, M.D., I.M.S., with effect from the date on which he assumes charge until further orders.

The services of the undermentioned officers of the Indian Medical Service, are placed permanently at the

disposal of the Government of Bombay, with effect from the dates noted against their names:—

Captain S. L. Bhatia, M.C., M.D. Dated the 4th September 1923.

Major P. K. Gilroy, M.C., M.D., F.R.C.S. Dated the 14th November 1924.

LEAVE.

In modification of the orders already issued, Colonel H. Ainsworth, M.B., F.R.C.S., I.M.S., Inspector-General of Civil Hospitals, Bihar and Orissa, is granted leave on average pay for 6 months and 1 day and leave on half average pay for the remaining period up to a maximum of 8 months leave in all, with effect from the 13th March 1925, the date on which he availed himself of the leave.

Lieutenant-Colonel W. R. Battyc, D.S.O., I.M.S., an Agency Surgeon, is granted leave on average pay for 6 months, under Fundamental Rules, with effect from the 7th May 1925.

Lieutenant-Colonel C. B. McConaghy, I.M.S., an Agency Surgeon, is granted leave on average pay for 8 months, under Fundamental Rules, with effect from the 14th March 1925.

Lieutenant-Colonel R. F. Standage, C.I.E., I.M.S., an Agency Surgeon, is granted leave on average salary for 1 month, with effect from the 1st April 1925, or the date on which he avails himself of it.

The previous orders granting leave for 1 year to Captain R. H. Malone, M.D., I.M.S., Acting Assistant Director, Bombay Bacteriological Laboratory, are cancelled.

PROMOTION.

Lieutenant to be Captain.

C. R. Henderson, M.B. Dated 29th March 1925.

MISCELLANEOUS.

With reference to Army Department Notification No. 2649, dated the 15th August 1919, the Governor-General in Council is pleased to direct the publication of the following Royal Warrant, dated the 17th March 1925, regarding the age for compulsory retirement of an Indian Medical Service officer holding the appointment of Director, Medical Services in India:—

George R. I.

Royal Warrant.

Whereas we deem it expedient in the interests of the Service to make the following change as to the age at which officers of Our Indian Medical Service holding administrative appointments shall be placed on the Retired List.

Our Will and Pleasure is that an officer of Our Indian Medical Service holding the appointment of Director of Medical Services in India shall be placed on the Retired List on attaining the age of 60.

Our Warrant dated 13th June 1919, shall be amended accordingly.

Given at Our Court, at St. James's this 17th day of March 1925, in the fifteenth year of Our Reign.

By His Majesty's Command.

(Sd.) BIRKENHEAD.

NOTES.

THE NORDHOFF-JUNG CANCER PRIZE.

We are requested by the Biological Department of Georgetown University, W. Washington, D.C., U. S. A., to publish the following notice:—

"The Commission for the distribution of the Prize for Cancer study founded by Dr. Sofie A. Nordhoff-Jung, in agreement with the Foundress, has resolved to distribute the Prize from now on only every two years to the double amount of the sum allotted heretofore, that is one thousand (\$1,000) Dollars. The next prize will reach distribution in 1926."

MESSRS. WATSON & SONS' X-RAY CATALOGUE.

MESSRS. WATSON & SONS (ELECTRO-MEDICAL), LTD., Sunic House, 43, Parker Street, Kingsway, London, W. C. 2, have recently published Parts I. and II. of a new general catalogue which will be of considerable interest to radiologists and hospital superintendents generally. By the adoption of a comprehensive sectional system with a liberal allowance of both sectional and general indices, reinforced by a novel system of item enumeration in which the first three figures of the item number form the page reference, the catalogue has been made especially easy for reference. Thus in the scheme for a complete installation for all purposes, the numbers given at the side of each apparatus mentioned enable one immediately to turn up the pages where detailed descriptions of each is given. The whole volume is admirably got up, very informative with regard to radiology in general, and free from trade puffs and superlatives.

Among many other interesting items listed are a new hospital transformer outfit for generating x-rays, devised to secure numerous economies in detail of working, but still efficient and suitable for all but the heaviest demands, and adaptable for either direct or alternating current; a new dental x-ray apparatus, where the tube and the high tension transformer are both immersed in oil in an earthen container, forming a self-contained unit, with all external high tension leads eliminated, thus doing away with the need for extreme caution in using x-ray apparatus for dental work; a portable x-ray outfit, consisting of four packages, each light enough to be carried by hand, if used for an alternating current not exceeding 125 volts; or of six such packages for direct current, and reaching the high figure of 90,000 peak volts, yet suitable for connecting with the ordinary domestic electric supply; and a constant tension x-ray outfit for deep therapy. The section on radium therapy is of general interest, as an account is given of the metal itself, of types of containers, applicators and accessories. At the end of the catalogue is a very useful bibliography of recent works on x-ray and radium work in general.

Publishers' Notice.

SCIENTIFIC Articles and Notes of interest to the profession in India are solicited. Contributors of Original Articles will receive 25 reprints *gratis*, if asked for at the time of submitting their manuscripts.

Communications on Editorial Matters, Articles, Letters and Books for Review should be addressed to THE EDITOR, *The Indian Medical Gazette*, c/o Messrs. Thacker, Spink & Co., P. O. Box 54, Calcutta.

Communications for the Publishers relating to Subscriptions, Advertisements, and Reprints should be addressed to THE PUBLISHERS, Messrs. Thacker, Spink & Co., P. O. Box 54, Calcutta.

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The Editors of the *Indian Medical Gazette* cannot advise correspondents with regard to prescriptions, diagnosis, etc., nor can they recommend individual practitioners by name, as any such action would constitute a breach of professional etiquette.

Original Articles.

THE TREATMENT OF FRACTURES OF THE ELBOW JOINT.

By H. HALLILAY,

LIEUT.-COLONEL, I.M.S.,

A BROKEN bone is an immediate calamity to the sufferer, entailing weeks or even months of pain, disability and financial loss, with the possibility of ending in a lifelong disaster.

The apathy of surgeons in general to this class of injury, and the resignation of the public to deformity and disability which so often follow it both spring from the same cause; the knowledge that the results are too often mediocre at best and very bad indeed at the worst.

A cynical piece of advice current in my student days and attributed to a famous Barts surgeon was:—"If a patient ever comes to you with a Colles' fracture, give him five shillings and tell him to go to the doctor at the other end of the street."

Whether the advice be sound or unsound, it illustrates the fact that fractures do not or did not arouse that interest amongst surgeons that is extended to more dramatic and picturesque emergencies although the matter is of the greatest moment to the patient.

When I was House Surgeon in my London Hospital, it was rare indeed for the visiting surgeon to put up a fracture himself; that business devolved almost as a matter of course upon the Resident.

This was not because the surgeon lacked humanity or conscience, but was merely a tacit confession that the difference between the results obtained by himself and those of the veriest tyro was so slight as to be for all practical purposes negligible.

When the surgeon is confronted with one of these somewhat formidable cases which give the title to this article, he has a choice of two lines of action. He can put the fracture up in full flexion in the hope that in some mysterious way the fragments will be beguiled into their own places so that the bone will be restored to its original shape, or he can do an open operation and replace the pieces very much in the manner of one solving a jigsaw puzzle, insuring against any subsequent displacement by fixing the fragments by means of Lane's plates and screws or by wiring or any other means of internal fixation which may appear suitable.

The first method has the sanction of no less an authority than Sir Robert Jones, the second is advocated by a great original surgical genius—Sir Arbuthnot Lane.

It is claimed by the followers of the first method that it is possible to replace the fragments in their own places and that once replaced the tendon of

the triceps will prevent displacement while the closure of the joint in full flexion will prevent the deposition of cellus in situations which might lead to the limitation of movement afterwards.

Those who practise this method express their complete satisfaction with the results which they obtain and say that their results are so good that they never wish to try any other. Were the enthusiasm of the patient for the method as great as that of the surgeon, one would probably be convinced of its excellence and there would be little to do except to register one's approval, but, as a matter of fact, the end results of many of these

No. I.



Photo taken on 20-2-24.

cases treated in this manner are highly unsatisfactory to the patient. Too often there are limitations of movement, usually in the direction of extension and even more frequently a deviation in alignment of the forearm on the humerus.

The result of this latter deformity is to impose a serious handicap in the playing of games, a formidable disadvantage in a country where proficiency in athletics is accounted more than the wisdom of Solomon.

What commonly occurs is that a child of 9 or 10 years of age sustains a T-shaped fracture of the humerus which is treated by immobilization in full flexion. After a longer or shorter interval

the limb regains a measure of its former mobility, the child does not complain and the medical attendant assures the parents that the result leaves nothing to be desired. Only when the child attains school-going years and comes under the notice of the games master does the deformity attract attention and too late it is discovered that the child has acquired a lifelong disability as a result of the treatment to which the fracture has been subjected.

Surgeons speak of these cases as rare, or only occurring in the practice of those less skilful than themselves in the treatment of this class of injury.

In my own practice in the course of the past few years, I have frequently been asked to advise

No. II.



Photo taken on 21-2-1924.

as to the best treatment of these disabilities; I infer, therefore, that these unsatisfactory results are not so uncommon as is generally supposed; in any case the surgeon who originally treated the limb would be the last to be consulted for the deformity for which rightly or wrongly he is held responsible.

To anyone who has any experience in the operative treatment of these injuries it is very difficult to understand how the surgeon can expect to replace the fragments by manipulation through a pad of thickened and cedematous tissue if the displacement is of more than the slightest degree, in view of the difficulty of restoring the

contours of the bone even with the facilities afforded by an open operation.

The radiograms published with this article illustrate the difficulty of dealing with these fractures by external manipulation alone, however competent the surgeon in this method of treatment.

I should explain that in the case in question this result was obtained after two previous attempts at "setting," of course under full anæsthesia, so the unhappy patient was subjected to three separate manipulative offensives under chloroform before the attainment of the very mediocre result illustrated by the skiagrams.

The boy's parents were then told that the results left nothing to be desired and that in a very short time it would be impossible to tell that a fracture had taken place.

As many months after the injury the boy was unable to extend his arm beyond a right-angle, it will, I think, be admitted that the standard accepted by many members of our profession with regard to the end results of treatment of these injuries is not an exacting one.

The following is a brief history of the case:—A. B., aged 13, fractured his arm by falling from a height. In February 1924 the arm was "set" under an anæsthetic on the same day of the accident.

The next day the arm was reset under chloroform and the following day as the fragments were still in a bad position one more attempt was made to replace them under an anæsthetic.

The final result of these three manipulations is shown in skiagram No. 3.

A critical examination of these skiagrams will well repay the trouble. Skiagram No. 1 shows the fracture after the first "setting"; No. 2 shows the results of the second "setting"; No. 3 shows the results of the third "setting"; No. 4 was taken 24 days after the last occasion on which the arm was "put up," and finally, No. 5 was taken nearly two months after the original fracture. This skiagram is rather misleading as it would appear that the arm is fully extended, whereas the patient was and is unable to extend it beyond a right-angle. It displays admirably the lateral deviation to which I have adverted in the earlier part of the article, both bones with the attached articular surfaces of condyles being displaced to the ulnar aspect of the limb with a resulting bayonet-shaped deformity and distortion of the outline of the limb.

If the skiagram No. 1 be examined carefully it will be seen that the articular condyles of the lower extremity of the humerus preserve their normal relationship to the corresponding surfaces of the head of the radius and of the olecranon respectively.

What usually happens in these fractures is that the break runs through the coronoid and olecranon fossæ and a variable distance above the external and internal epicondyles, a continuation of the original violence carrying the forearm with

No. III

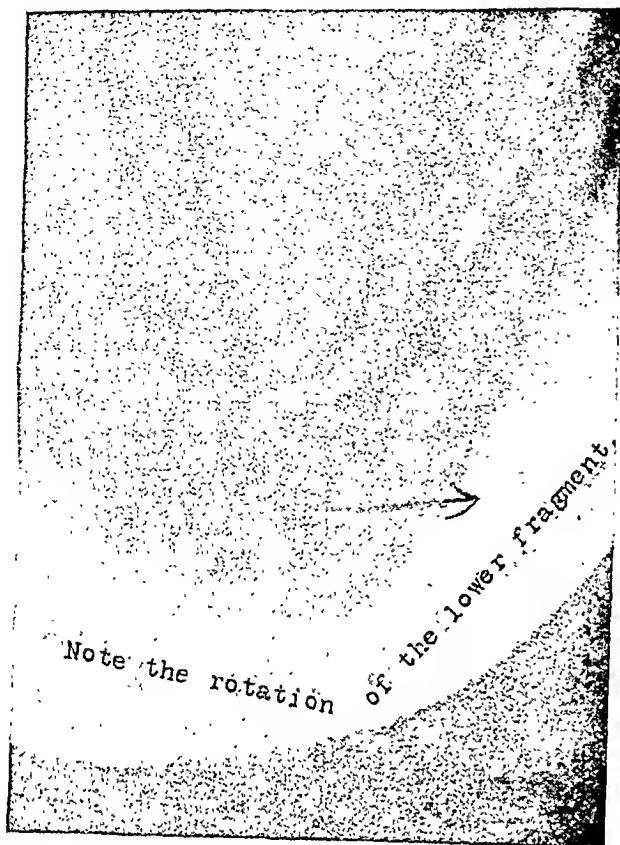


Photo taken on 22-2-1924.

No. IV.

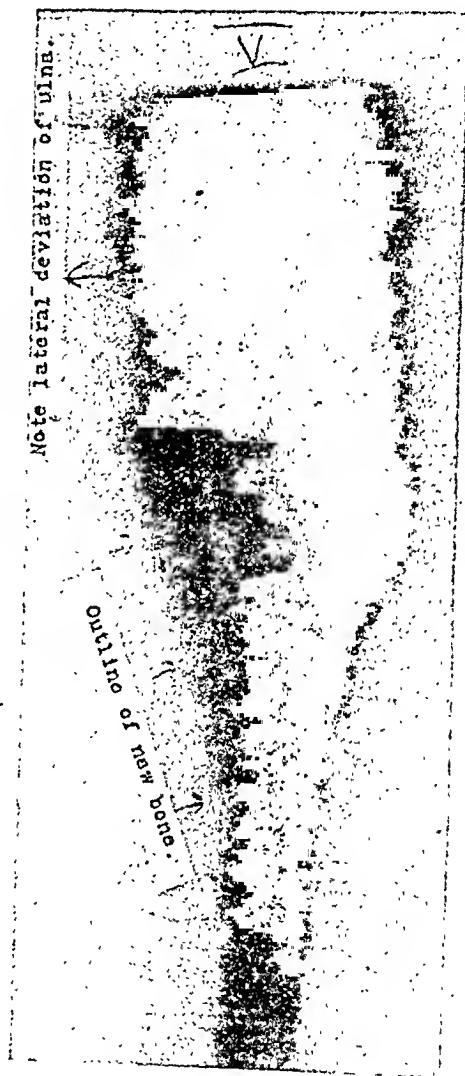


Photo taken on 15-3-1924, i.e., 24 days after arm was "put up" in No. 3.

the attached lower end of the humerus bodily backward and upward behind the lower end of the upper fragment.

The fact that the articular surfaces of the lower end of the humerus maintain their normal relationship to the bones of the forearm is explained when it is remembered how these bones are tethered together by the ligaments of the joint and by the origins of the flexor group of

No. V.



Antero posterior taken on 26-4-1924.

muscles on the internal aspect of the joint and that of the origins of the anconeus and the extensor muscles on the external aspect.

I have drawn attention to these anatomical details as they have a very important bearing on the results of the treatment by supination and full flexion.

As the forearm is flexed on the upper arm the lower fragment of the humerus is rotated with it by the drag of the stretched extensors and anconeus so that by the time that the arm is in a position of full flexion the lower fragment rotates with it 90° or more.

In other words the lower fragment is rotated on the upper through 90°, and if union takes

place that arm can never attain more than 90° of extension or in ordinary language the patient will never be able to extend his arm beyond a right-angle.

A glance at the skiagram will show that this is what has taken place in the case under discussion, and explains the inability of the patient to extend his arm beyond a right-angle.

Skiagram No. 3 shows very clearly the rotation which has taken place of the condyles of the humerus in harmony with the flexion of the forearm.

Skiagrams No. 4 and 5 show the shaft of new bone which is being laid down laterally in consequence of the faulty alignment of the fragments, the whole forearm being displaced inwards on the upper fragment.

In time the original shaft in its lower two-thirds will be entirely absorbed and will be replaced by the new shaft now shown in process of building. Note too the mass of callus which has been laid down behind the lower end of the upper fragment completely locking this part of the joint. This state of affairs hardly bears out the contention of those who practise this method of treatment that the strap of the triceps by its pressure prevents the deposition of callus at the back of the joint!

As a rule the worse the fracture the greater the indication for open operation, even the most enthusiastic advocate of manipulative methods can hardly claim that he is better able to deal with these badly comminuted fractures through a pad of oedematous and swollen tissues than would be the case were the parts clearly exposed to the eyes and instruments of the surgeon.

I hope to deal with the operative treatment of these difficult cases in a subsequent paper.

A PRELIMINARY NOTE ON THE PHARMACOLOGY AND THERAPEUTICS OF *ADHATODA VASICA* (BASAK).

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(Indigenous Drug Series No. 6).

Adhatoda vasica is a small evergreen sub-herbaceous bush belonging to the natural order acanthaceæ. It grows all over the plains of India and in the lower Himalayan ranges ascending to a height of about 4,000 feet above the sea-level. In Sanskrit it is called *Arusak* (not angry), *Vansa* (giving perfume), *Vrisa* (chief), *Sinha Mukhi* (lion mouthed). In Hindi it is called *Arusha*, in Bengali *Bakas* or *Vasaka*, in Northern India it is known by the name of *Bhekkar* or *Basuti* and in Persian it is called *Bansa*. The name *Adhatoda* is of Tamil origin.

The plant has minutely pubescent entire leaves arising from swollen nodes; the flowers are white or purple in colour. It is well known to the people throughout the country and a yellow dye is commonly obtained from its leaves. The leaves, the root and the flowers are extensively used in indigenous medicine as a remedy for colds, cough, bronchitis and asthma. It is often given in the form of juice extracted from the leaves, mixed up with ginger or honey, in doses of $\frac{1}{2}$ to 1 ounce. A decoction is also made from the leaves, and dried leaves are administered in powder form in doses of 30 grains. Both the decoction and powder form constituents of many preparations used in the Ayurvedic medicine for various affections of the respiratory tract. In chronic bronchitis and asthma it is said to be specially efficacious. For the latter disease the dried leaves are made into cigarettes and are smoked. U. C. Dutta says "the medicine was considered so serviceable in phthisis that it was said no man suffering from this disease need despair as long as *Vasaka* plant exists." Juice of the leaves is used in diarrhoea and dysentery and in Southern India the powdered leaves are used in malarial fevers. In Burma and in Northern India the leaves are applied locally in form of poultice on rheumatic joints, inflammatory swellings and in neuralgias. The leaves are said to be toxic to all forms of lower life, prevent the growth of lower aquatics and check the development of parasitic vegetation. According to Watts, the alcoholic extract of the leaves is poisonous to flies, fleas, mosquitoes, centipedes and other insects. From the above remarks it will be seen that the plant is popularly believed to have remarkable medicinal properties. We, therefore, decided to investigate the claims made regarding its efficacy.

CHEMICAL COMPOSITION.

As long ago as 1888, Hooper published details of chemical analysis of the drug carried out by himself. He found that an odorous volatile principle probably of the nature of an essential oil and a non-volatile body of the nature of an alkaloid called 'vasicine' were present. Hooper's work was confirmed by Boorsma of Java, who further investigated the alkaloid and tested its physiological properties but we have not been able to find any records of this work. We have made a thorough analysis of the drug and worked out its pharmacological action and therapeutic effects. The details of this work will be published in the *Indian Journal of Medical Research* and we will confine ourselves here to a brief summary of the results attained. Owing to want of suitable apparatus we could not collect a sufficient quantity of the essential oil to test its physical, chemical and physiological properties but this difficulty has been removed and the work is in hand.

The alkaloid is found in the leaves to the extent of 0.25 per cent. The base occurs as

needle-shaped crystals and has a melting point of 182°C . It is easily soluble in alcohol, is slightly soluble in cold water but more so in hot water. A 2.0 per cent. solution in chloroform is optically inactive. Vasicine hydrochloride occurs in light cream-coloured crystals and has a melting point of 180°C .; it is very soluble in water. Vasicine tartarate is also prepared and is a soluble salt. The molecular weight of vasicine was determined and found to be 188 which agrees with the empirical formula of $\text{C}_{11}\text{H}_{12}\text{N}_2\text{O}$ found by analysis.

PHARMACOLOGY OF VASICINE.

The alkaloid vasicine and its salts are not very toxic to undifferentiated protoplasm. It has little or no effect on the free living protozoa such as *Paramœcium caudatum* nor has it any toxic or inhibitory effect on the cultures and growth of streptococci, staphylococci, *B. coli*, *B. diphtheriæ* or *B. tuberculosis*. It is possible that the antiseptic properties of the leaves recorded by previous observers may be due to the volatile principle. Solutions of concentrations of 1 to 5 per cent. are not irritant to the mucous membrane. The alkaloid has a bitter taste but has no marked effect on the movements of the alimentary canal. In high concentrations (1 in 20,000) the peristaltic movements of the isolated gut are inhibited, probably owing to depression of the vagal endings. Intravenous injections in animals produce a slight fall of blood pressure due partly to direct depressing effect on the cardiac muscle and partly to depression of the terminations of the vagi in the heart. There is no effect on the blood vessels.

In lungs of experimental animals the alkaloid, when given intravenously, produces a slight but a persistent broncho-dilation. This action is in all probability due to depression of the vagal terminals in the bronchi as it is absent after small doses of pilocarpine. After administration of atropine the broncho-dilator effect is very much pronounced. The drug has a well marked expectorant action and it is probable that the essential oil plays an important part in this direction.

THERAPEUTIC USES OF *Adhatoda Vasica*.

We have tried clinically an alcoholic extract made from fresh and dry *adhatoda* leaves during the last three years. Previously a tincture made from the leaves was given an extensive trial in various civil hospitals and dispensaries in different parts of India at the instance of the Indigenous Drugs' Committee. Most of the evidence produced showed, and our own conclusions are in accord with it, that the drug has a well marked expectorant action. In acute bronchitis we found that it always afforded relief, specially where the sputum is thick and tenacious, acting in very much the same way as *ipecaeuana*. In chronic bronchitis the cough is relieved, the sputum is liquefied so that it is brought up more easily.

The depression of the vagal terminations further relieves irritation and spasm of the bronchioles. We have also tried the extract in a number of cases of bronchial asthma but relief given by it was not very marked. As our animal experiments have shown the synergistic action of atropine and vasicine we are now trying a combination of the extract with belladonna preparations in cases of vagotonic origin and the results will be published in due course.

As regards the effect of the drug in tuberculosis of the lungs our conclusions are also in accord with those of the Indigenous Drugs' Committee. The drug is absolutely useless in curing or preventing the progress of this disease in experimental animals or human beings. There is no doubt, however, that it relieves the irritable cough by its soothing action on the nerves and by liquefying the sputum which makes expectoration easier.

CONCLUSIONS.

(1) Chemical analysis of *Adhatoda vasica* shows the presence of two active principles:—

(a) An alkaloid vasicine whose empirical formula we have found to be $\text{C}_{11}\text{H}_{12}\text{N}_2\text{O}$ = molecular weight 188.

(b) Traces of a volatile principle of the nature of an essential oil.

(2) Vasicine has no marked action on the alimentary canal or on the circulation. It produces slight but persistent broncho-dilation in experimental animals and this effect is considerably increased after administration of atropine.

(3) Clinically a fluid extract prepared from the leaves has well marked expectorant properties and relieves bronchial spasm. It has no effect whatever in pulmonary tuberculosis.

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MERCUROCHROME 220 IN THE TREATMENT OF MALARIA.

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SINCE the introduction of mercurochrome 220 as a urinary antiseptic, it has been propelled by its enthusiasts along the path which is traversed by many of the new drugs, until it would seem that a veritable panacea is now available for suffering humanity.

Malaria has been included in the inventory of diseases which are amenable to treatment by this dye, which is a fluorescent compound of mercury—the di-sodium salt of 2,7-dibromo-4-hydroxymercurifluorescein—and reports of the

action of mercury and of fluorescent substances in the treatment of malaria would indicate that it should not be without action as a plasmodicide.

Thus Barlow (1916) has described beneficial results from the exhibition of mercuric chloride in malaria. Greig and Ritchie (1917) showed that a combination of mercuric chloride and quinine was more effective than quinine alone in reducing the size of malarial spleens, though they were less sanguine than Barlow of the therapeutic value of mercury. Cremonese (1918) claimed that mercury is a powerful curative agent for malaria. Attempts have been made to increase the effect of quinine on the parasites by the injection of fluorescent substances such as fluorescein or eosin and Rusznyak (1920) found that such substances increased the value of quinine both in vitro and in vivo.

In view of the possibilities of mercurochrome we decided to test its value as a curative agent in malaria and thanks to the courtesy of Dr. E. A. O. Travers, we were enabled to select a benign tertian and a malignant tertian case. The drug was made up to a strength of 0.5 per cent. and a daily intravenous dose of 20 c.c. was given.

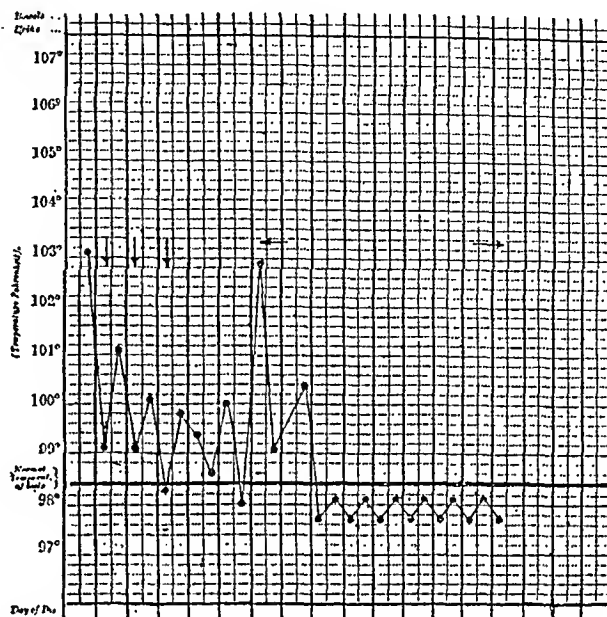
Case I.—Double benign tertian infection. The patient was a Tamil, 20 years of age, and weighed 95 lbs. He had had an attack of malaria three months previously and his spleen was enlarged to the costal margin. The temperature on admission to hospital (March 2nd) was 103.1°F.; he was given a purgative and aspirin grs. x. The following morning a double benign tertian infection was diagnosed from blood films, and mercurochrome was administered on the 3rd, 4th and 5th of March. Aspirin was also exhibited to control the temperature. On the 6th of March mercurochrome was discontinued as a stomatitis developed which required energetic treatment. The following day aspirin was withdrawn and quinine grs. xxx daily prescribed, but the patient refused to swallow it. On the 8th of March the temperature rose to 102.9°F., there was a rigor, after which the patient took the quinine, and the temperature rapidly fell to normal. On the 16th of March he was discharged at his own request.

Daily blood examinations were carried out on the patient and the percentage of infected corpuscles showed little, if any, diminution from the 3rd until the 9th of March. The *P. vivax* cycle continued in a normal manner and the mercurochrome had no influence on the staining properties of the parasites. The exhibition of quinine was followed by a speedy disappearance of the parasites. From the blood examinations we concluded that the partial control of the temperature was due to the aspirin rather than to the mercurochrome.

Case II.—Malignant tertian infection. This case was of Chinese (Hokian) nationality, who had had occasional attacks of fever since his arrival in Malaya 15 years before, but his spleen was not enlarged. His age was 45 years and he weighed 140 lbs. He was also admitted to

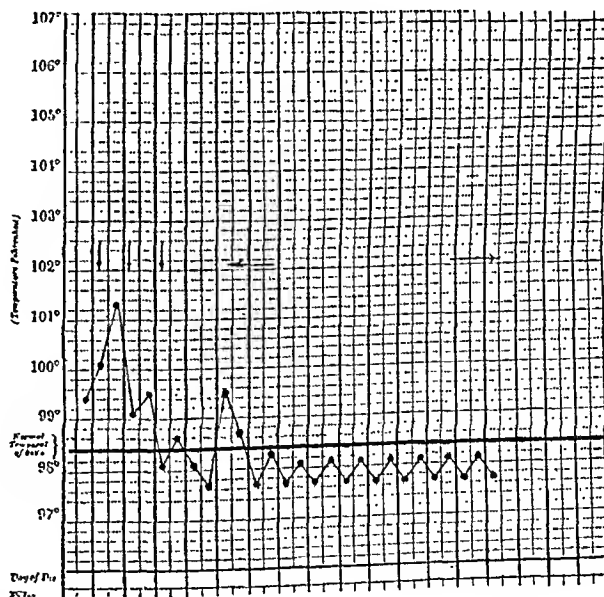
hospital on the 2nd of March and his temperature was then 99.4°F. He was given a purgative and the following morning malignant tertian rings were found. On the 3rd, 4th and 5th of March intravenous mercurochrome was given

Chart I.



Case I.—Double benign tertian infection treated with mercurochrome.

Chart II.



Case 2.—Malignant tertian infection treated with mercurochrome.

and on the 6th of March injections were discontinued on account of stomatitis. The temperature was normal on the 5th and 6th, but rose again on the 7th. Quinine grs. xxx was then exhibited daily until the 17th, when he asked for his discharge.

Blood examinations showed the presence of parasites until the day following the prescription of quinine though the percentage of infected cells in the peripheral blood fell somewhat from the 3rd to the 6th.

This patient was given no aspirin, but it is doubtful if the fall in temperature can be ascribed to the mercurochrome. We have seen a number of malignant tertian cases which after admission to hospital lose their fever and parasites decrease, sometimes even disappear from the peripheral blood, even if specific treatment is withheld. This we regard as evidence of partial immunity which, aided by rest in bed and good feeding, is able to deal with the infection sufficiently to cause such a reduction in the number of parasites that all symptoms are lost.

CONCLUSIONS.

In the above case of benign tertian malaria, a total of 0.3 grammes of mercurochrome was given over three days. On the withdrawal of aspirin and three days after the last mercurochrome injection a typical rigor occurred with a temperature of 102.9°F. The malignant tertian case received a similar quantity of mercurochrome and fever recurred two days after the last injection. The dye appeared to have little effect on the number of malaria parasites in the peripheral blood and caused no modification in their staining properties.

In neither case did albuminuria develop.

We consider that the action of mercurochrome on malaria parasites is practically negligible, and that, in view of the unpleasant sequelæ which result from its exhibition, it should not be given in cases of malarial fevers.

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CATARACT EXTRACTION.

Notes on 17,000 Operations.

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BAMDAR is a Santal village in the district of Monghyr in the Province of Bihar. The Mission Hospital is one of three that are maintained by the Santal Mission of the United Free Church of Scotland Santal Mission. As the work of this Mission lies mainly among the Santals, an aboriginal tribe living in small villages in the more remote parts of the country, the stations are located, not in populous centres, but in the "jungle". Bamdara with a population of about four hundred people is larger than most of the villages in the neighbourhood, but it is about the average size of the Indian village. It must

not be supposed that cataract is a very common disease in this part of the country. Of the 17,000 operations to which these notes refer, only two were performed on people living in Bamdara. Blind people and other eye cases travel very long distances to hospital, often begging their way, and the railway authorities often give them free passes. (There is a railway station, Simultala, on the East Indian Railway, about fifteen miles from Bamdara.) The fact that the hospital is situated on a popular pilgrim route by which every year hundreds of thousands of Hindus travel from North India to Baidyanath, twenty miles from Bamdara, and thence to Jagannath or Puri, has no doubt helped to make it known and made patients disposed to come to it. It is a very common occurrence for a patient to come to the Christian hospital to have his sight restored and then to travel on to a Hindu shrine to offer thanksgiving. The total here recorded is the accumulation of thirty-four years' work, and has been of slow growth. Beginning work in 1890, I carried on for four years without a hospital, operating on my writing table and finding accommodation for the patients in odd corners. For nine years longer the verandah of the hospital served as an operating room, but a proper operation room was built in 1903. In the first year, after the opening of the hospital, the number of cataract operations was 34. The numbers increased till they reached 1,440 in 1921, and that average was maintained for the two following years, 1924 promised to be the record year; 900 cataracts were extracted in the first two months, but I left for furlough in March. It may be noted here that there are seasons for cataract operations (and for other operations for chronic conditions not demanding immediate relief) in India. At least 90 per cent. of the people are cultivators of the soil and they choose a time for operation when there is not much work to be done in the fields. The favourite season, in North India at least, is the interval between the harvest and the sowing, from January to June. Then parties of patients often come from one village or locality, personally conducted by a former patient, who shows his gratitude by bringing more grist to the mill and claims a share in the religious merit which is supposed to be the supreme object of our work. Thus it happens that in the busy season as many as fifty or more operations may have to be performed in a day. It should be explained that the hospital is a general one; although the great majority of the operations are on the eye a fair amount of general surgery and a large medical practice have also to be undertaken. In 1923 the total number of operations was 3,400, of which 2,890 were eye operations. Of these 1,426 were for cataract. Next to the cataracts the most numerous operations were 526 iridectomies (for corneal opacities and glaucoma); 382 expressions for trachoma; 194 entropions; and 149 tattooings for leucomata. (When both eyes were operated on, that was

recorded as two operations. One operation might have to be recorded as a failure, the other as successful.) My wife, who is a medical graduate, has performed a large number of the general operations and a few cataracts also. During the very busy spell at the end of 1923 and the beginning of 1924, I had the efficient help of Dr. Arthur F. Smith, who came to relieve me for furlough. On previous furloughs the work was carried on by Dr. James Kitchen and Dr. J. N. Turnbull. In 1924 the number of cataract operations was 1,519.

The preparation of the patient does not, as a rule, begin till he or she is on the operation table. We have no "waiting list"; owing to the crowds of patients and the limited accommodation, we try to dispose of the cases with as little delay as possible. Work in India is not without its compensations; we have abundance of fresh air and sunshine, and are less troubled with sepsis than one would expect. A visitor to the hospital, who had been trained as a nurse in the Edinburgh Royal Infirmary, once astonished me by remarking:—"How clean the people are here, compared with Edinburgh." The difference was that the people in Bamdah Hospital wore very few clothes and that, on account of the heat of the climate, they bathed, as a rule, every day. We have often fairly cold weather with a touch of frost at times in January. At such times many of the people give up bathing and are much dirtier. The procedure for disinfecting the eye is to clean the skin thoroughly with petrol (we used benzine for a time but petrol is much cheaper and seems to do as well), then with soap and water, and finally, with corrosive sublimate, 1 in 2,000. The speculum (all the instruments are boiled, except the knives, which are dipped in pure carbolic and then washed in boiled water, and kept between operations either in rectified spirit or in lysol solution, 1 in 20) having been introduced the conjunctival sac is syringed out with corrosive sublimate, 1 in 4,000. In the early days cocaine was the anæsthetic used. Eucaine was then used instead as it was much cheaper, but as it was found to have a vasodilator action it was combined with adrenalin when that drug was introduced, a 2 per cent. solution of cocaine hydrochloride being mixed with an equal amount of adrenalin chloride, 1 in 1,000. When the war broke out, it was impossible to obtain eucaine, but owing to the large quantities of contraband cocaine that had been seized by the Government of India that drug was still available and we took to using it again and have continued to use it. The method that has been adopted during the last two or three years has been to use the salt itself in solid form. This has been found to be more economical, and the powder seems to be less irritating than the solution. About half a grain is applied to the conjunctival sac. Whether the solution or the powder is used, the first application is made about twenty minutes before the operation, the second, when the patient lies

down on the table. If eucaine is used, it cannot be applied as a powder, for it does not dissolve in the tear water as cocaine does. For many years now capsules of nitrite of amyl have been kept in readiness for cases that might show signs of collapse as the effect of the cocaine, but we have never had occasion to use them. Chloroform is given to children, but hardly ever to adults. The retching and sickness that often follow the administration of chloroform are a nasty complication in cataract extraction. If deeper anæsthesia than ordinary is necessary, as in cases with high tension, the cocaine may be given more freely, combined with adrenalin, which seems to reinforce its effect. (We do not combine adrenalin with cocaine as a routine, as we do with eucaine, as the cocaine has less effect as a vasodilator.) But the best thing to do in an eye with abnormal tension is to perform a preliminary iridectomy, postponing the extraction of the lens.

In the operation itself the only serious departure from the usual procedure is the rupturing of the capsule, not with the cystitome, but with the point of the cataract knife while the corneal incision is being made. I can claim no originality for this modification, as I saw it being practised by Pope in Madras in 1902, and he told me he had adopted it from his predecessor, Drake Brockman. It has several advantages. One very important advantage is that it saves an instrument. Undoubtedly the most serious risk to which the cataract patient is exposed is that of septic infection at the time of operation, and the fewer the instruments used the better. Another advantage is that it saves time, and the sooner the operation is finished and the eye bandaged, the better is the prospect of rapid and satisfactory healing. Then on rupturing the capsule, we find out the character of the cataract. If there is a flow of milky matter, we know we have a small nucleus to deal with and a smaller corneal incision is necessary. Again, if the capsule is tough, resisting the point of the knife, we know we have a case in which the removal of the lens in the capsule may be attempted with a fair measure of safety. One instrument which I invariably use and prize highly but which, I do not think, is in general use is Pagenstecher's lens expressor, made of porcelain. The curve fits that of the cornea and it exercises more even pressure than any other instrument I have seen, and being of porcelain it is less likely to injure the cornea than a metal instrument. It is thus very useful for stroking the cornea after the expulsion of the lens, to remove the debris. In my opinion it makes irrigation unnecessary. It also has to some extent the effect of an iris repositor.

For dressing, pledgets of absorbent cotton wool that have been steeped for several hours in a 1 in 2,000 corrosive sublimate solution are used, and they are kept in position by a roller bandage made of the light cotton cloth called *bafta* that is

sold in the Indian bazars. As a rule, both eyes are bandaged. Nearly all our patients are accompanied by relatives who cook for them and attend to them generally; if a patient has no one with him and has sight in the eye that has not been operated on, that eye is left unbandaged. If all is well the eyes remain bandaged for two days, the dressing being done every second day. (In India we learn to be explicit about these things, for, if a patient is told that he will be dressed the second day, he understands that to mean the next day.) On the eighth day the bandages are removed and the patient is kept two or three days longer in hospital before being allowed to go home. It should have been mentioned that after operation a few drops of a 1 per cent. solution of acriflavine are instilled into the conjunctival sac. At subsequent dressings a 1 in 4,000 corrosive sublimate solution is used to clean the eyelids, but atropine is not used unless there are signs of iritis. Every patient takes home with him a good supply of corrosive sublimate, 1 in 5,000, and is told to use it as an eye lotion morning and evening for ten days or longer, if necessary. Most of the patients are vegetarians, for which they are none the worse, from the surgical point of view, and diet is a simple matter. The Indian patient attaches very great importance to diet in the treatment of disease and insists upon being told what he should eat and what he should avoid while under treatment. He divides all articles of food into two kinds:—*pahlan*, the eating of which promotes recovery, and *baran*, the things that retard it. The advice, we give them, is to confine themselves to soft foods, boiled rice and pulse, and to avoid food that requires chewing. It sometimes happens that there is a patient who has no one along with him and who on account of caste scruples is unable to take food cooked by any one in hospital or near it. In such cases a kind of peas-meal that is in common use is very useful. It is made by roasting peas and then grinding them and all that is necessary is to mix it with water. The rice water in which the more well-to-do patients have boiled their rice is usually available to eke out the scanty food supplies of the poor. (The patients bring their own food, or get it from other patients.)

It has been mentioned that a preliminary iridectomy is considered to be the best plan to adopt in cases of high tension. It may be added that a preliminary iridectomy is an advantage in any case. We have not reverted to making this the rule, the delay involved would be hardly justifiable in ripe healthy cataracts; but every patient who consults us about immature cataracts and every patient who has come to have a ripe cataract removed and whose other eye has an unripe cataract is strongly advised to have a preliminary iridectomy. Cataract extraction where there has been a preliminary iridectomy is a very simple and safe operation, especially when the capsule is ruptured with the point of the cataract

knife, for then the knife is the only instrument that enters the eye-ball.

The operation of removing the lens in the capsule, as advocated and practised by Colonel Henry Smith, is very popular in North India, and there is a great deal to be said in its favour. When Smith first began to practise it, I gave this method what I considered a fair trial by doing a hundred extractions as far as possible according to his directions. I gave it up because it seemed to me to be too risky, the cases of escape of vitreous being too frequent. It should be added that at first Smith extracted without an iridectomy and I followed him in this respect, but afterwards he did the operation with iridectomy. Smith also said that he would not advise anyone to operate by his method unless he had received personal tuition from him, and I have not had that advantage. He also insists upon the necessity of having a specially trained assistant, and that is another difficulty in the way of the general adoption of the operation. When successful, it is a beautiful operation, and as I have indicated above, I do it occasionally in cases where the capsule is tougher than usual. The case for which Smith's operation is specially indicated is the immature cataract, and it seems to be more easily performed and safer in such a case. As Smith truly says, many a man is ruined, while waiting for his cataracts to ripen. An old *rani* with unripe cataract consulted me a few months ago. She was still able to sign her name but she could no longer read the cheques she was asked to sign and she feared that her estate was being swindled away from her. She was not willing, however, to have an operation, as she had been told that there was a medicine that cured cataract if dropped into the eye; but if I had had more experience of Smith's operation I would probably have pressed her to submit to it.

The rule in selecting cases for operation is:— If the patient can no longer count fingers but can still distinguish light from darkness and has a pupil that responds to light, he is ready for operation. Of course, cases of absolute blindness are rejected, but there are cases, where there is still some perception of light but where the iris is inactive, that are not to be operated on without careful consideration. As a rule, it is better to do a preliminary iridectomy. For the last year or two we have been testing practically all cases with the tonometer, but I attach as much importance to the action of the pupil as to the reading of the tonometer. In one case, for example, I was at first unwilling to operate in a case of cataract where the pupil did not respond to light, but on the tonometer being applied the reading was moderate and re-assuring, with the result that I operated and the eye was lost from hæmorrhage.

On one point I have never had any doubt and that is the advisability of the iridectomy. Experience has amply confirmed the advice received from Maitland Ramsay in student days, that

without iridectomy you will get some prettier results, but that with iridectomy you will have a larger proportion of successful cases. But in the cases where the patient expels the lens before an iridectomy has been done, it is better not to attempt to do an iridectomy, and the iridectomy may be omitted in cases of soft cataract which drain away when the capsule is opened.

We see a great many cases of cataract which have been couched. In too many cases they come to us because they are hopelessly blind. One eye was operated on by a *rawal*—(as the professional coucher is called)—and at first the results seemed good but the dislocated lens, acting like a foreign body, set up irritation and the sight of both eyes was completely lost from iridocyclitis. In a good many cases I have been able to fish out a dislocated lens by means of Taylor's vectis before the eye had become blind. The coucher, however, scores an occasional success—indeed, I have had the humiliation, in one case at least, of operating unsuccessfully on a patient whose other eye had been successfully operated on by couching. It is hardly conceivable that the *rawals* could maintain their reputations if they were not sometimes successful. In one kind of cataract, the morgagnian, with a small nucleus and a milky cortex their results are often good. In endeavouring to dislocate the lens the coucher very likely ruptures the capsule, the milky matter escapes and is absorbed and the small nucleus lies quiescent in the posterior chamber.

Owing to the prevalence of corneal ulceration, due in a great many cases to small-pox, there is a large number of cases of cataract complicated with corneal opacity. It is a very common occurrence to do an iridectomy for corneal opacity and then to find behind it a cataract. In many cases the cataract is really traumatic, due to the ulcer having perforated and being of soft consistency it can be evacuated through the opening made for the iridectomy. Trachoma is a very common complication and in many cases demands prolonged treatment before an operation for cataract can be performed with safety. Dacrocystitis, however, is less common than at home; in 1923 I performed only 7 operations for extirpation of the sac.

For testing results, as in other respects, our methods are rough and ready. Probably not more than 5 per cent. of the patients can read or write. As a rule, if the patient can see to sow and reap and to herd cattle, he is content. A case is recorded as successful if fingers can be counted in the case of an illiterate person, or if good large print can be read with the help of glasses. There are some illiterate persons, such as weavers, tailors, shoemakers, etc., who require spectacles. There have been several engine-drivers who after operation have been restored to duty. In 1923 the percentage of failures recorded was 1.6 per cent.—1.2 per cent. from suppuration and 0.4 per cent. from hæmorrhage.

Many of the cases of suppuration were preventable. Some patients decamped to the bazar a few hours after the operation, others removed their bandages to have a look round or rubbed their eyes with dirty fingers. It is the after-treatment that is the difficulty. The patients behave well on the table. There are exceptions, but, as a rule, they are much less neurotic than Europeans. As an example, an old man brought his daughter to me for cataract extraction. (Probably her husband was willing to keep her only on condition that her father arranged to have her sight restored; but that is another story.) The woman had a child she was nursing and when she lay down on the table the old man took the child. The child cried so much that it upset the mother and I told the old man to give the child back to its mother. He did so, the mother put the child to the breast and I removed her cataract while she was feeding it.

With so many cataracts to treat, one ought to be able to have something to say about the cause of cataract. My experience suggests that the main cause is the glare of the sun. Bamdah is situated about 320 miles to the north-west of the Bay of Bengal, and the great majority of the cataract patients, and the other eye cases, come from the hot dry regions further inland, and comparatively few from the moister and cooler districts to the south-east. We have a saying in India that eye disease is in inverse proportion to rainfall. Cataract, at least, seems to become more prevalent as we retreat from the sea and reaches its maximum in the very hot and dry Punjab. Not much significance is to be attached to the fact that a large majority of the patients are men, for owing to social custom and physical difficulty women come to the hospital less readily than men. It would be interesting to know whether cataract is less common among the women who are confined to the *zenana* in India than among those who live an open air life; but on a matter of this kind it is difficult to get accurate information.

A very important point in cataract extraction is the sharpness of the knife. Any dragging on the wound is very likely to cause an escape of vitreous, and a ragged wound heals less quickly than a clean one. I send my cataract knives to Weiss in London for repair, for I have yet to discover any one east of Suez who knows how to sharpen a cataract knife. To keep the knife in good condition I rely on its being kept thoroughly clean and thoroughly dry. I have given up smearing the knife with vaseline or any other lubricant but I always clean the knife myself and, as the cataract knife is very often used for iridectomies as well as for cataract operations, it often happens that I do a hundred or more corneal sections with the same knife before sending it for repair.

There is a great field for ophthalmic surgery in India, and far from being exhausted it is just beginning to be reaped. When I go on

tour, I find scores of people blind from cataract in villages only a few miles from Bamdah, who have never realised that it is possible for them to have their sight restored. The number of such cases throughout the country must be enormous. It is worth while recording that this work has not in the least been interrupted or interfered with by the anti-foreign agitation of recent years. At the time when the non-co-operation movement was at its height, the hospital was fuller than it had ever been.

To conclude with a word on finance. The hospital is supposed to be supported by the Mission, but it would be nearer the truth to say that the hospital supports the Mission. It is open to all, but the patients are encouraged to give voluntary donations, and they do so very willingly. If one rupee were received for every operation, that would practically meet the outlay, and we are approximating to that standard. There are a few compulsory charges, as for private rooms, which are rented at from one anna to ten annas a day and spectacles are sold at a small profit. The District Board (which corresponds to the County Council in England), gives a grant of £40 per annum, so that altogether the income is more than the expenditure. To be explicit, the expenditure in 1923 was about Rs. 3,600 (including everything except my own salary, which should not be debited entirely to the hospital as I have to perform all the duties of a district missionary in addition to the medical work), and the local income was about Rs. 6,000.

EXCISION OF THE PINEAL BODY OF A MONKEY UNDER INTRA-ARTERIAL ANÆSTHESIA.

By J. P. ARLAND,

LIEUT., I.M.S. (T. C.),

Indian Station Hospital, Kirkee.

A LARGE adult red-faced monkey was placed on the table and the whole of the head and neck shaved. The right carotid sheath was exposed by an incision along the anterior border of the sternomastoid under infiltration anæsthesia. The common carotid was carefully dissected out. A clamp was applied to it in order to shut off the blood stream. The head was next elevated and the neck massaged in the direction of the venous flow. It was noticed at this stage that the internal jugular vein was in a state of collapse.

Twenty c.c. of a 2 per cent. solution of gum acacia containing $\frac{1}{4}$ gr. of cocain hydrochloride, along with 5 minims of adrenalin hydrochloride (1 in 1000) were slowly injected into the lumen of the collapsed artery.

The flow of the solution was indicated by the progressive blanching of the red-skinned head and face.

The internal jugular vein was now clamped.

After a lapse of 5 minutes the head and face were found to be completely anæsthetic.

Cushing's crossbow incision was employed, the transverse incision passing well over the occipital protuberance. The median incision was prolonged upwards for $2\frac{1}{4}$ inches. The incisions were deepened right down to the bone and the flaps retracted laterally. Emissary veins were stopped with Horsley's wax. Two small trephine holes were made, one on each parietal eminence. Two similar holes were next made $1\frac{1}{2}$ inch below each parietal eminence respectively and $1\frac{1}{2}$ inch from the median or sagittal line. A Gigli's saw was introduced and a square piece of bone was removed. Intracranial tension was diminished by puncture of the lateral ventricle. The dura



Shewing Pineal body between blades of forceps.

mater was carefully incised $\frac{1}{4}$ inch away from the longitudinal sinus. An aneurism needle was passed through the falx cerebri and the sinus ligatured and divided. The falx cerebri was cut right through and the inferior longitudinal sinus clamped and ligatured.

The cerebral hemispheres were gently retracted by thin copper spatulæ. The great vein of Galen was followed and the splenium of the corpus callosum was identified. The pineal gland was observed as a small greyish-yellow body immediately under the splenium. It was removed by forceps.

Observations.—

1. The anæsthesia was very sound.

2. The common carotid artery was clamped to shut off the blood current, in order to provide a bloodless field for the action of the anæsthetic. The presence of blood has a retarding influence on the power of the anæsthetic solution.

3. The addition of gum acacia combined with adrenalin increases the duration of the anæsthesia.

4. The internal jugular vein was clamped in order to lock in the injected solution as far as possible.

5. No signs of shock were noticed either during or after injection.

6. The monkey recovered.

TREATMENT OF HÆMORRHOIDS BY STRANGULATION AND SNIPPING METHOD.

By D. R. KEHAR,
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Indian Station Hospital, Landi Kotal.

DURING the last five years I have treated about three hundred cases of hæmorrhoids (external and internal) by the 'strangulation and snipping method' and have come to the conclusion that the results are efficacious and long lasting. The patients treated were from 14 to 50 years of age and the hæmorrhoids were in all stages of inflammation. I have tried all the methods given in the text-books, but the above mentioned method always took preference in my cases and gave very encouraging results. There is less danger of hæmorrhage from the ligature slipping. It is less painful to the patient, there is a minimum of bother to the operator and the help of an assistant is not required.

Technique.—The patient is given a good dose of castor oil the night before the operation and two or three soap and water enemata in the morning until no fæcal matter is passed. The patient is not given any food except milk twenty-four hours before the operation. The part is shaved, tincture of iodine and a T-shaped bandage applied.

Anæsthesia may be general or spinal. As soon as the patient is under the effects of the anæsthetic, tincture of iodine is again applied to the part and also about 6 inches around it. The anal canal is dilated with fingers and the piles are caught with a pair of Spencer-Wells' forceps or pile ring forceps, lifted up from the underlying structures and drawn out. Then a half-curved 1½ inch long needle threaded with No. 3 or No. 4 catgut suture about 16 inches long is passed through the base of the pile. The suture is drawn through the base of the pile to the extent of about 12 inches so that about 4 inches of it is left behind. These two ends are then tied round the half of the base of the

pile. This is the first strangulation suture. The small arm of the suture without the needle is held aside along with the pair of forceps in the left hand. The long arm carrying the needle is carried round to the other side of the base of the pile and passed through it and parallel with the first suture and as near to it as possible. The needle after having been taken out on the other side of the pile is passed through the loop thus formed by the long arm of the suture round the base of the pile and tightened. With the same ligature similar loop-sutures, two above and two below the base of the pile, are passed and tightened. These sutures will completely strangulate the pile. The small and the long end of the suture are then tied round the whole of the base of the pile. The mass within the bite of ligatures is snipped away with a pair of blunt-edged scissors. In this way all the piles are treated. An india-rubber tube 5 inches long is inserted into the rectum, sterilised vaseline smeared round the anal margin and dressings are applied.

After-treatment.—The india-rubber tube is taken out after 24 hours, the part is washed with warm sterile saline solution and the raw surface touched with the following solution every day:—

| | |
|---------------------|---------|
| Tr. ferri perchlor. | 1 part |
| Tr. opii | 2 parts |
| Tr. myrrh | 1 part |

For four days the patient is given only milk and some astringent mixture to stop the action of the bowels. On the 5th day the patient is given one ounce of castor oil by the mouth and a rectal injection of two ounces of olive oil. The bowels act without any trouble. The patient can be discharged on the 7th or 8th day after operation.

This method is also useful in cases of partial prolapse with piles.

THE MIDWIFE IN INDIA.*

By C. C. MURISON, F.R.C.S.E., D.P.H., D.T.M.,
LIEUT.-COLONEL, I.M.S.,
Civil Surgeon, Belgaum.

BABY WELFARE is a very important subject in most countries but it is especially so in a country like India where special conditions have to be contended with. These conditions are innumerable and during this week you will no doubt hear many of them mentioned or discussed. In my opinion the one condition in India which has much to do with baby welfare is the "midwife," who has also much to do with the maternal welfare. She is in medical charge before, during and after the birth in a big percentage of the confinement

* Being a lecture delivered on 27th April 1925 during "Baby Week", at Belgaum.

cases. I have seen much of the results of the cruel and dirty methods of the indigenous *dhai* or untrained midwife in India and these methods are too revolting to be discussed here. Further, I do not intend to bore you with statistics but you can take it from me that the infantile and maternal death roll in their hands is high. The *dhai* in addition is responsible for the crippling and maiming of a big percentage of the mothers and infants. I am making these remarks not with the intention of blaming her; as she does her best in accordance with what she has been taught, but simply with the object of helping to devise means by which not only the infantile and maternal death rate but also the maiming and crippling of the infants and mothers in midwifery practice in India will be reduced to an absolute minimum.

India is a very conservative country, and the causes which contribute towards this state of affairs are chiefly religious and social prejudices and ignorance of the masses. These causes are difficult to overcome but in my opinion they can be conquered in a few years; provided, of course, all or some of the recommendations to be made are handled in a business-like manner; some of the remedies adopted for improving these conditions in the past have not been handled in such a manner, with the result that they are on the verge of failure.

The Government and various associations spend much money in getting Indian ladies trained and qualified as "midwives"; while the authorities of public dispensaries refuse to employ them, and if they have employed any of them they get rid of their services on various absurd grounds, for instance, one midwife's services were dispensed with as there was not sufficient work for her and the little work which had to be done could be done by a female ward servant.

This raises the question, "How are they to make a living?"

Many of you no doubt will say "Start a private practice." This is not an easy matter as, besides establishing herself in private practice, she has to compete with the indigenous *dhai* or untrained midwife who is already well established as were her mother and grandmother who most probably were also indigenous *dhais*. Further the charges of the indigenous *dhais* are so small that it is impossible for the qualified midwife on such terms to make a living.

The result of this is that we have great difficulty in getting candidates to come forward for training, and many of those who do apply for training are unsuitable and so the system by many is considered to be a failure.

In my inquiries about the non-employment of qualified midwives at dispensaries, I am informed that the chief reason is that there is not sufficient work for them. My conten-

tion is that this is a wrong way of looking at this subject, as the work will come and increase after a midwife has been employed, and not till then. The increase of work will be slow and gradual, and so the employment of a midwife should not be condemned until it has been tried for a few years.

The maternity wards of the Civil Hospital, Belgaum with its up-to-date appliances and a large staff of well qualified persons (as Civil Surgeon, lady doctor, other medical men, European and Indian midwives and nurses and also trained menial staff) has taken several years to increase its numbers of maternity cases as seen from the following figures:—

| Year | 1910 | 1911 | 1912 | 1913 | 1914 | 1915 | 1916 | 1917 |
|-----------------|------|------|------|------|------|------|------|------|
| Maternity cases | 8 | 13 | 21 | 28 | 40 | 42 | 42 | 50 |
| Year | 1918 | 1919 | 1920 | 1921 | 1922 | 1923 | 1924 | |
| | 38 | 40 | 47 | 47 | 65 | 93 | 131 | |

Other patients, suffering from diseases or conditions connected with midwifery practice, have also progressively increased both amongst the out-patients and in-patients.

With the object of improving the maternity practice conducted by the indigenous *dhais* or untrained midwives the Government of most of the provinces of India have legislated for the training, examination and registration of midwives. The result of this is that there are now many registered midwives but this unfortunately, except in a few cases, has not affected the indigenous *dhais* who continue to practise midwifery in their old dirty and cruel methods. Therefore some measures should be taken to improve their methods.

I suggest that:—

1. All women including indigenous *dhais* who are practising midwifery without having passed an examination in midwifery and in the management of infants, and are not registered as a "midwife" with the authorised Nursing Association of the province should be enrolled.

2. All enrolled *dhais* should be put through a regular prescribed elementary course of training in surgical cleanliness, midwifery, feeding of infants, etc. at a midwifery hospital.

3. The elementary course of training should be prescribed by the authorities of these midwifery hospitals.

4. The period of this training should be about one month in a large hospital and longer in a small hospital. Therefore from a financial point of view it is preferable to train them at a large hospital.

5. The training depending on the available finances should be:—

(a) Free.

(b) Part payment by the *dhai*.

(c) Full payment by the *dhai*.

6. All *dhais* who have gone through the training should be styled "trained *dhai*" and be

registered as such with the authorised Nursing Association of the province, but separate from the midwives and nurses. The registration should be free of charge.

7. After a few years, say about five years, no indigenous or untrained midwife should be permitted to practise in midwifery, provided of course the local conditions permit of this suggestion being enforced.

8. If a midwife or trained *dhai* is not available in an area to replace an indigenous or untrained *dhai* at the end of the prescribed number of years, the authorities should consider the appointment of a midwife or trained *dhai* on a salary or part time salary.

9. In the course of time the indigenous or untrained *dhai*, and later the trained *dhai*, will gradually cease to exist, and then the normal midwifery practice, unless the customs change, will be carried out chiefly by the midwives.

I may here state that:—

(a) In the year 1902 I, as Residency Surgeon at Baroda, on being asked expressed views similar to the above and later was a member of a committee which selected indigenous or untrained *dhais* for this training.

(b) Dr. A. de Gama, Assistant Director of Public Health, Central Registration District, Poona, during the "National Baby Week" in Kirkee last year, suggested that all untrained *dhais* who were practising midwifery should be trained for about a fortnight in the elements of cleanliness and non-interference.

(c) In the *Times of India* of Saturday, 27th December, 1924, you will see that the Kaira State last year had 49 *dhais* trained under the scheme for the improvement of *dhais* in Sind; 38 of these *dhais* appeared for the examination and 32 passed. The examiner who came from Multan made the following remarks:—"I was not only surprised but extremely pleased at the way most of them answered questions. It does their teacher great credit that they have learnt so much. They really seem to understand the evils of dirt and the value of cleanliness, and one hopes that superintendents will be forthcoming who will see that what has been learnt is put into practice, and also that the *dhais* who have been so willing to learn will be very much better paid than heretofore".

Now why cannot something of this kind be done in other parts of the country? Why not in Belgaum district?

The following two conditions are necessary to make the above mentioned recommendations to be a complete success:—

(a) Money.

(b) Legislation.

I am given to understand that the committee of this "Baby Week" has collected a very large sum of money and that a big percentage of it will not be spent, and so I ask the committee to consider the transferring of a large sum of

money to the Belgaum Indian Midwives' Association, whose object amongst others is to train Indian ladies at the Civil Hospital, Belgaum, for the midwives' and nurses' examinations held by the Bombay Presidency Nursing Association. The Belgaum Indian Midwives' Association has been established with the approval of the Government and it is managed by a committee of which the Collector of Belgaum is president and the Civil Surgeon is the Honorary Secretary and Treasurer. The accounts of the Association are audited by the Government auditors. It is quite possible that amongst you here there may be some who would like to follow the splendid example of His Highness the Mir of Khairpur, who gave a donation of Rs. 10,000 towards the midwives' scheme of Sind. Donations, contributions and subscriptions could be given to the Belgaum Indian Midwives' Association for the specific purpose of training these indigenous or untrained *dhais*, and later when the indigenous or untrained have all been trained, or are not forthcoming for any training, the money could be spent in training Indian ladies for the midwives' examination held by the Bombay Presidency Nursing Association as is being done at present.

"Baby Week" is being held with the object of improving conditions which affect the baby, and so I appeal to you all not to postpone important questions but to act in the matter immediately. For example, give money to the Belgaum Indian Midwives' Association to start the training of the indigenous or untrained *dhais* of Belgaum district as early as possible. I am confident that a large number of *dhais* will come forward for training as we have had many applications from them for training. The training of the indigenous or untrained *dhais* can be got through while legislation is under consideration and being obtained.

To make this scheme a success we must have legislation for enrolling the indigenous or untrained *dhai*, registering the trained *dhai*, etc. If legislation is not obtained then the scheme will be a failure as some of the indigenous or untrained *dhais* will refuse to be trained, and the system of having indigenous or untrained *dhais* will continue with its dangers.

Some persons are of the opinion that legislation will be cruel not only to the indigenous or untrained *dhais* but also to some of the public. I have considered this question from several aspects and I am unable to arrive at this opinion. This legislation will not be as cruel as the doing away with unqualified medical practitioners in the United Kingdom towards the end of last century. This was done by the unqualified medical practitioners having had to qualify by passing the ordinary professional examinations and getting registered as medical practitioners; and all this had to be done in the course of a few years. Those of them unable

to do this had to look in other spheres of life to make a living. On looking through the recommendations made by me it will be seen that they are not so drastic, on the contrary they are most considerate in every way possible.

This question of midwifery practice in India has to be faced with another great difficulty, and that is that a big percentage of the deaths among the mothers and infants during labour occur in the difficult and abnormal cases.

The present training which the midwives in India receive is based on that of the United Kingdom where all the midwifery cases attended by a midwife are within easy reach of medical practitioners who do much midwifery practice. In India the male medical practitioner does very little midwifery practice, and moreover the areas out of the easy reach of the medical practitioners are very considerable.

The training of the midwives and the "rules for the practice of midwives" enable the midwives to conduct only normal cases and compel them to be dependent on the medical practitioners in all the difficult and abnormal cases. In other words, in the areas within reach of medical practitioners the responsibility of the difficult and abnormal cases can be transferred from the midwife to the medical practitioner, but the question arises as to what is to be done in the areas out of the easy reach of the medical practitioner?

This demands a constructive and not a destructive criticism. I say this because I have been told that a midwife should not do more than conduct normal confinements. Then how is this difficulty to be got over?

The midwife, in these difficult and abnormal cases out of easy reach of a medical practitioner, is helpless, and this helplessness is due entirely to her training and the "rules for the practice of midwives." I know midwives who are quite capable of doing more than the rules permit them to do, but in an emergency they will be afraid to do their best, as a complication or a death may occur when they exceed their duty and then they will be liable to have their names removed from the register of midwives and this may mean ruin to the midwife.

With the object of making you realise the situation let us take an example of a difficult and abnormal case of labour in your family, in charge of a good midwife, at 2 A.M. in a country place out of the reach of a medical practitioner. Is this midwife to sit there and let the mother and infant die, or do something to save them? I am sure you will all say "do something to save them". How can she, when her training and the rules permitting her to practise midwifery prohibit her. It can only be done by her being trained for it, and the rules should be amended so as to let her act up to her training. This means that she should be trained to be an "operating midwife".

It has been argued that it is impossible to have a semi-qualified medical practitioner in the person of an "operating midwife," and so if such a person is required then a female medical practitioner of the standard of the L. C. P. S., with or without a midwife, should be employed. In my opinion this is also impossible as the female medical practitioner will neither practise nor accept a poorly paid appointment in the country districts. Further, her appointment meets the requirements of overcoming the difficult and abnormal labour case but she will not do any of the nursing duties. Consequently we must have someone who will not only do the nursing but also conduct the difficult and abnormal cases.

If the law can permit a midwife to practise midwifery, that is, to conduct normal labour cases then under the special conditions of India the law should be amended to permit an "operating midwife" to practise midwifery, that is to conduct the abnormal as well as the normal cases. Therefore we must consider the question of the qualifications for the "operating midwife".

The candidates for the L. C. P. S. qualification have to matriculate at an university or pass an equivalent examination and then undergo a four years' course of medical training, while a general hospital nurse and a midwife have to undergo respectively a three years' and a year's training. Taking these courses of training into consideration I suggest that the "operating midwife" should be intelligent, with a fair general education, and have gone through a four years' training briefly as follows:—

Medical and surgical nursing (including medicine and surgery more advanced than usual) in the first three years of training.

| | |
|--------------------------------------|-----------------------------------|
| Midwifery including operations, etc. | } in the fourth year of training. |
| Midwifery, nursing and anaesthetics | |

The training in midwifery should be such that they will or can always be independent of medical practitioners and especially so in India, as at present the male medical practitioner is very seldom called in to conduct a normal case. In short they should be able to cope with any emergency, including operations.

A few years ago the committee of a dispensary discharged a midwife, not because she was inefficient but simply because the "rules for the practice of midwives" prevented her from conducting the difficult and abnormal cases. They said that she was useless to them as they wanted a midwife capable of conducting the difficult and abnormal cases and thus independent of the male medical practitioner.

The next question which needs consideration is:—"Where and how are we to employ these trained *dhais* and midwives?"

Some of them will no doubt start a private practice, but what about the majority of them?

We must find them employment otherwise the whole of the scheme for training them will be a failure. In my opinion one or more midwives or trained *dhais* should be employed at every dispensary or hospital. It is absurd to expect menial servants to perform the work of midwives. It is neither fair to the midwives nor to the patients. These midwives and trained *dhais* should be available for district work. This means that a fund for the maintenance of these midwives and trained *dhais* should be established at these dispensaries and hospitals. The authorities of these dispensaries and hospitals will undoubtedly be pleased to establish the fund, and also contribute to the fund, but it is up to the public to subscribe liberally towards the fund and make it a success. The scheme should be so framed that the subscribers will get the services of a midwife or trained *dhai* at reduced rates while the non-subscribers should pay heavier fees.

The object of this lecture is to show the importance of this question in relation with baby welfare, and I hope that those concerned (on this occasion the Executive Committee of the "National Baby Week", Belgaum) will consider this subject and act further in it if convinced of its importance.

A PUBLIC HEALTH POLICY.

By W. C. ROSS,

LIEUT.-COLONEL, I.M.S.,

Director of Public Health, Bihar and Orissa.

THERE is a welter of misunderstanding with regard to the term "public health," and a confusion of ideas with regard to its needs and policy. Public health—in the correct sense of the term—is an inclusive entity which deals with all matters concerning the health of the individual, as well as of the community, and all that appertain thereto, and arise therefrom. Curative and preventive medicine, hygiene, legislation and administration, psychology, economics and finance all come within its scope and all demand study and balanced consideration. In contemplating public health policy and administration, it is necessary to take into consideration all these factors, otherwise the policy is likely to be crude, raw, and inapplicable, and the end will be failure.

Preventive medicine has been arrived at by a process of evolution from curative medicine, and is based upon the wider application of the principles of medicine and of general science to the benefit of the community as a whole, and not of the individual alone. It is, in effect, an altruistic application of knowledge to the general good, and it naturally uses all sources and sorts of knowledge in a wider and more general manner than was contemplated in the philosophy of general medicine in the past.

Nevertheless, although differing in essence and in application, both curative and preventive medicine have much in common and are founded upon the same bedrock of exact knowledge in many branches of science, and they cannot be separated altogether. There is always a tendency to administer in water-tight compartments and to separate entirely the branches of work which are in any way separable. This tendency is bad, and leads to inefficiency and overlapping and leaves too much to the controlling administrator, and too little to the co-operation and co-ordination of the activities of the branches of work concerned.

Curative medicine is the parent, and still keeps its hold too strongly on the public mind, because the individual patient expects individual benefit. In other words, the selfishness of the citizen is the stumbling-block to the development of public health.

Preventive medicine is the modern offspring—new, eager and with high ideals and aims. The lack of a communal conscience, and the weakness of public opinion in India have retarded its growth and postponed its development, and the lack of a policy, funds and organisation have prevented the possibilities of untold benefit to the people and the country. Curative medicine cures its tens, but preventive medicine can save its thousands; yet it is still neglected and ignored though the latent possibilities of its future are golden with promise.

Curative medicine has been organised on an extensive scale for many years and has its hospitals and dispensaries throughout the land. It has a large medical and subordinate staff and much money is spent upon it. Still there is a cry and a need for expansion. There should be at least one dispensary in every public police *thana* and there is great need of a better medical staff in the dispensaries. The rural dispensary is itself capable of much improvement; the equipment of drugs and instruments is grossly inadequate and too often the doctor in charge has forgotten much of what he ever learnt.

Better dispensaries and better doctors are necessary and it is no use improving the dispensary equipment before better doctors are available. The tendency to lower the standard of medical knowledge required to obtain a diploma must be stopped. The standard should be raised and not lowered. A good doctor with inadequate equipment can do much but the best equipment in the hands of a bad doctor is useless. The policy should, therefore, be to raise the standard of medical knowledge in the first place and to provide better equipment subsequently.

The need for medical relief in rural areas is very great, and is accentuated by the fact that most graduates and many licentiates will not practise in rural areas, but prefer to starve in the towns, and eke out a livelihood by means which should be beneath their dignity. The problem is partially an economic one and partially due to

the preference for work in a circumscribed area and under the most comfortable and convenient conditions. As a practical means of overcoming this difficulty, and inducing young doctors to start practising in rural areas, I would suggest a policy of subsidising suitable doctors in selected rural areas. A regular subsidy which would obviate the risk of financial failure and enable a doctor to settle in a rural area without the fear of being starved out, might enable many rural areas to obtain resident doctors. Such has been the policy adopted in the rural areas of Ireland for many years, and such a policy is free from much risk, or wasteful expenditure, and has great possibilities of success. I would suggest that provincial governments should give recurring grants to district boards for this purpose and that district boards should select the places where doctors would be most useful, and should select the doctors for the posts from a general list of suitable qualified medical men, to be maintained by the provincial government in the medical department.

Preventive medicine has not yet been developed or organised. Its future lies before it pregnant with promise as yet unfulfilled, but the hope of fulfilment is faint and far under present conditions. There is no royal road to success and there is no short cut to achievement. The first essential is to know the facts, the second to know what is wanted, the third to consider how to obtain it, and the fourth to arrange to get it. So far as we have got at present, we know only the facts—the sad fundamental facts of disease, sorrow and suffering. We know that epidemics ravage the land and that preventable disease causes untold suffering. What is wanted is a policy—a strong clear call to tackle the problem and to fight preventable disease. For this a leader is required, a real political leader whose aim is to relieve and benefit the body politic. There is no inherent difficulty in dealing with the situation. It only requires courage, selflessness, and steady determination. The facts are plain and simple and the policy may also be plain and simple. Legislation is required in order to create local authorities and to give them ample powers to carry out necessary preventive measures. Legislation is required to control the individual and to compel his respect for the rights and safety of others. The existing public health legislation is so defective, tentative and unsuitable that it might almost as well not exist for all the real good it does.

The next essential is a provision of funds. Nothing can be done without expenditure, and nothing will ever be done until the financial problem is tackled in a statesmanlike and courageous manner. It is idle to prate, in platitudes, of noble intentions for improvement. Money talks. Begin by arranging to provide adequate funds and continue by laying down a definite policy as to what is wanted, what is aimed at, what is

hoped for, and proceed then to carry it out and apply it.

I would suggest that the policy at first should be restricted to dealing with epidemic and preventable diseases, to the education of the community with a view to obtaining their understanding of, and co-operation in, preventive measures, and to the enactment of legislation to control the individual in matters affecting the health and safety of others, and to organise and direct the preventive measures required in dealing with epidemic and preventable diseases.

In the consideration of how to carry out such a policy it is obvious that a large staff will be required and that organisation will be needed—complete in detail and comprehensive in scope. Organisation is the basis of prevention, and anticipation is its aim and essence. Organisation implies staff and equipment and it must be based upon local knowledge of the villages, the roads, the language, the conditions of life, and the lives and minds of the people themselves. Good organisation, therefore, demands decentralisation, and must be carried out by local authorities, and not by a central administration.

The central administration should be concerned with such functions as those of co-ordination in administration, legislation, control, and financial assistance, maintenance of standards of staff, equipment and efficiency, inspection of work, advising as to appointments, rules, regulations, and working procedure, co-ordination between local authorities and the compilation of statistical records and returns, etc., etc. Local authority should vest in district and local boards, with ample powers such as they do not now possess. The staff should be founded upon a unit posted at every police station, because the returns and reports are brought to police stations by village *chowkidars*. Such a unit should consist at the very least of a literate compounder in charge, a trained disinfectant and two *domes*. It should be provided with panniers or boxes with an ample stock of disinfectants and vernacular leaflets of instructions and advice how to prevent and avoid epidemic and preventable diseases. A few safe and simple remedies, etc., may also be included. The village *chowkidars* should be provided with coloured post-cards with the name of the village and *chowkidar* on them, and addressed to the police station. If red cards are used for cholera, yellow for small-pox, blue for plague, etc., it does not matter that the *chowkidar* cannot read. Usually he will not be colour blind. He should post or send or deliver the correspondingly coloured post-card to the police station at once as soon as a case occurs, and he should get a reward of four annas for every notification received within 24 hours. The reward will stimulate prompt reporting which is essential to the success of preventive measures. The post-cards (endorsed at the *thana*) will also serve as vouchers for the payment of the reward. The procedure is simple and effective. On

receipt of such a notification, the unit should obviously proceed at once to the village and carry out preventive measures. The units must be co-ordinated and controlled by an assistant health officer in each subdivision, with a district health officer in general supervising charge. There is room for a larger staff. The staff suggested above is a working proposition on the minimum possible scale.

The district health officer should be a servant of the district board and must, therefore, work under the orders of the chairman, but it is essential that he should co-operate with the Civil Surgeon who is the government medical and health officer in the district, who has all the staff and equipment provided by Government, at his disposal, and who is in direct receipt of all reports of births, deaths and epidemics through the district police. With this end in view the Civil Surgeon should always be a member of the district board, and should be the chairman of the Sanitation or Public Health Committee with definite powers of control over the staff delegated to him by the chairman. If the general principle of decentralisation be accepted, as I have enunciated it above, this procedure is the only one by which the desired co-ordination can be obtained. The Civil Surgeon as Civil Surgeon is a Government official, and cannot officially control a district board staff, but as a member of the district board and in co-operation with the chairman, the Civil Surgeon as a medical man of experience and standing can successfully co-ordinate the activities of the district board medical and health staffs, and the government staff.

Proposals have been put forward in recent years for the amalgamation of the medical and public health staffs in districts, and an attempt has been made in the district of Gaya to carry out such a scheme during the last 4 years. The result in Gaya has been a failure, unqualified and absolute, and the District Board of Gaya has realised this, and is now engaged in modifying its scheme. I do not consider that it is either wise or practicable to combine two such functions. A whole-time doctor is required in a dispensary, or if not, the dispensary is not required at that place. Further the dispensary doctor as he is at present, will not travel round doing disinfection and preventive and propaganda work. He wants practice and fees, and if these do not offer, he prefers a peaceful life in his dispensary. In any case it is practically useless to expect him to do public health work.

Preventive work requires an energetic and mobile staff, and necessitates the removal of all temptation to private practice. In my opinion, private practice should be absolutely forbidden to all health officers and they should draw a compensatory allowance in lieu of private practice. If private practice is allowed, even under rules and in special circumstances, etc., the only certain result is that the public health duties of the staff will be neglected. If this view is

accepted it becomes impossible to amalgamate the medical and health duties and staffs, and it is necessary to provide for two separate staffs, but it is not necessary to carry such separation so far as to prevent the district health officer from working in co-operation and co-ordination with the Civil Surgeon, functioning as a district board member and chairman of the committee, and authorised by the district board to undertake the general supervision and control of their medical and health organisations.

The need for a strong public health policy and a well-organised executive district staff is very great. Epidemic and preventable diseases are the curse of tropical countries with dense populations, and the cause of the majority of the deaths and by far the greater part of the disease. They constitute the most potent factor in sapping the vitality, and reducing the working capacity of the population, and they affect in the most profound manner the prosperity and well-being of the population. Yet all the time they are preventable: and yet all the time little is done to prevent them. The cost is held to be prohibitive and the funds cannot be made available. Nothing but lack of courage and imagination can admit of such a view. Wise expenditure on the betterment of the public health is the best investment possible from the national point of view. The problem is fundamentally one in economics and finance, and requires bolder, braver and wiser treatment than it has hitherto received. The present state of affairs constitutes a "vicious circle" in which the people are too poor to pay for health, and they are poor because their health is bad. It is only by breaking the vicious circle, by courageously facing the necessary initial expenditure, that any real progress can ever be made. There is nothing more certain than that a wise expenditure can and will bring in a great harvest which will provide further resources for a greater expenditure. The occasion awaits the man!

A Mirror of Hospital Practice.

FOUR UNUSUAL SURGICAL CASES.

By J. B. HANCE, O.B.E., M.B., B.Ch. (Cantab.), F.R.C.S.E.,

MAJOR, I.M.S.,

Civil Surgeon, Dera Ismail Khan, N.-W. F. P.

THE following four cases which have been treated in the Civil Hospital, Dera Ismail Khan, are recorded as showing features which are both unusual and noteworthy.

CASE I.

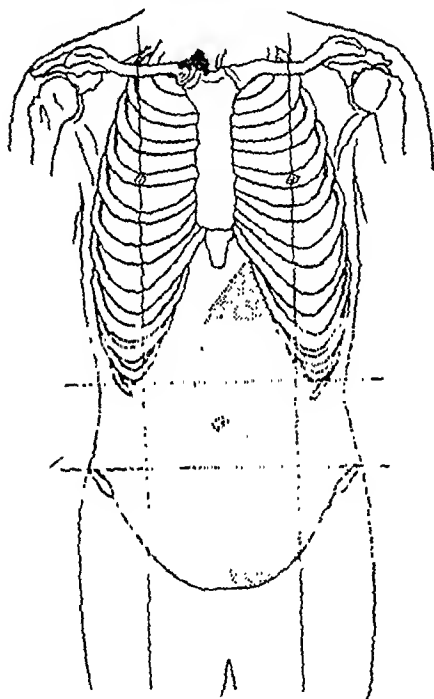
N. K., Mahomedan, male, cultivator, aet. 60, was admitted to hospital on 15th September, 1923, complaining of a painful swelling of the left side of the abdomen, of 25 days' duration, and which

had been increasing in size steadily since first noticed.

Personal history.—As far as could be obtained, showed nothing of note, and beyond periodical attacks of fever, the patient stated that he had always been healthy, and had led an active life. He had once passed blood in his urine about 2½ years ago, after a strain in lifting a heavy load, but it had quickly passed and he had taken no notice of it.

History of present disease.—Twenty-five days before admission, patient had an acute attack of pain in his left lumbar region which was colicky in character and shot downwards into the left inguinal region. These attacks lasted for a few days, and during them urine was passed frequently, with scalding pain and in small quantities.

Case I.



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Soon after the pain commenced he noticed a small swelling in his left flank which had daily increased. He had not vomited, nor had his bowels been interfered with, but he was under the impression that the amount of urine passed had been less than usual since the pain and swelling had begun. What urine he had passed had been passed freely and without effort, and since the first few days of his trouble, the act of micturition had been unattended with any pain.

He had not lost flesh before the onset of the present illness.

Condition on admission.—Patient was a thin man of fair general condition, with tic-tack heart sounds and thickened tortuous arteries. The abdomen was distended and moved poorly with respiration, movement being confined to the right flank. Respiration was almost entirely costal.

Facies hippocratica was marked, and the patient was restless and anxious, but invariably reverted to the left lateral position where he appeared to obtain the greatest ease, lying curled up with the knees drawn up. Palpation of the abdomen revealed a rounded tense swelling extending from two fingers' breadth below the ensiform to the symphysis pubis, entirely filling the left flank and side of the abdomen and extending as far as the outer border of the right rectus muscle on the right side. The swelling was of the general shape shown in the diagram and a fluid thrill was obtainable from all parts of it through to the flank. There was no constipation. Patient stated that he was suffering from continual gnawing pain in the left loin and back, and was most comfortable when lying on the affected side. Temperature 98°F., pulse 96 and of poor quality.

Diagnosis.—The previous history of blood in the urine, the nature of the early colicky pain with diminished urine, and the site of the tumour, together with the persistent lumbar pain, all pointed to the kidney as being the main cause of the trouble and on these factors and on the fluid thrill obtained, a diagnosis of hydronephrosis was made, and operation decided on. As it was late evening when the patient was seen, and satisfactory artificial lighting was not available, the operation was postponed till the early morning of the next day.

15-9-23. Operation.—The usual preparation was made. During the night, the pulse had lost in character, and the rate risen to 104. It was accordingly thought advisable to give him continuous intravenous saline during the operation.

On anaesthesia (A. C. E.) being attained, the anaesthetist, Dr. S. D. Ricley, was of the opinion that the patient would not tolerate the embarrassment to respiration of the usual lateral position admitting of the lumbar incision. Extra-peritoneal access could, therefore, only be obtained through an incision in the left mid-axillary line extending from the 11th rib above to the iliac crest, whence it was prolonged forwards towards the antero-superior spine. Two nerves, the last dorsal and the ilio-hypogastric were seen and preserved, but a third, presumably the ilio-hypogastric, was inadvertently cut in deepening the incision. The peritoneum having been stripped forwards, a large swelling presented itself, on needling which, thin, semi-purulent fluid was withdrawn. The diagnosis having been thus confirmed, the swelling was incised and large quantities of thin pale watery pus gushed out under considerable pressure. In all three-quarters of a large bucketful of this fluid was obtained. On exploring the swelling with the finger, it was found that the tumour was bilocular, the inner locus being thinner-walled than the outer, and constituting an enormously dilated renal pelvis, while the outer locus was lined with extremely thinned out renal cortex. From the pelvic locus an opening

admitting two fingers led into a widely dilated ureter, down which a stomach tube could be passed as far as the opening into the bladder, where its passage was obstructed.

The condition of the patient, and the fact that a secondary operation would obviously be necessary, alike precluded any attempt to investigate the nature of the obstruction. The cavity of the hydronephrosis was accordingly marsupialised to the wound in the parietes, the rest of which was closed by layers, drainage tubes were inserted and dressings applied, and the patient returned to bed.

An hour later the patient showed alarming signs of collapse, and was transfused with 16 ozs. of blood taken from the vein of a volunteer donor. Grouping was impossible, owing to the lack of facilities, and in view of the serious condition the risk of hæmolysis was taken. The effect, fortunately, was markedly beneficial, and the patient rallied.

A slight reactionary temperature, 100°F., occurred during the evening of the day of the operation and lasted as far as mid-day of the ensuing day, after which it gradually fell to normal. The pulse improved steadily, from 132 on leaving the operating table, and virtual disappearance an hour later, to a steady 102 throughout the second day, after which it fell steadily to normal limits.

Patient did extremely well until 28th September, 1923, the 14th day, when bronchitis supervened and the base of the left lung was found to be full of rales. The condition spread rapidly to the right base, with dyspnoea and signs of cardiac embarrassment. On 4th October, 1923, patient's relations removed him, against advice and on their own responsibility, in order that he might die in his house.

CASE 2.

K. M., a Mahomedan woman, æt 20, was admitted to hospital on 3rd October, 1923, suffering from absolute constipation of 3 days' duration.

Previous history.—For the past year the patient had felt a rounded moveable swelling between the umbilicus and the pubes. Four months previous to admission, she became pregnant, but aborted at the third month of pregnancy. About ten days after the abortion she noticed that her original abdominal tumour was increasing in size. For three days previous to admission she had suffered from absolute constipation, neither fæces nor flatus being passed. She vomited on taking anything by mouth, but spontaneous expulsive vomiting had not taken place.

On admission.—Patient was a thin undernourished girl. The face was drawn and anxious and she was in severe pain, which was colicky and spasmodic in character, causing her to draw up her knees.

Temperature 97.8°F., pulse 96, respiration 24.

The abdomen was much distended, the distension being general, and rendering palpation

extremely difficult. No localising signs indicating the site of the obstruction could be obtained. On vaginal examination the whole posterior fornix was flattened out by a tense cystic-feeling swelling, which displaced the uterus forwards and to the right. The cervix was softened and the os admitted the tip of the index finger.

Recto-vaginal examination did little further to elucidate, except to strengthen the impression that the pelvic mass was cystic. A rectal tube passed easily for 18 inches, and a high warm water enema was given slowly with the patient lying on her left side. This, with the exception of a few small scybala being returned unchanged, operation was decided upon.

Operation.—Under A. C. E. anæsthesia, by Dr. S. D. Rieley. A median sub-umbilical incision about 5 in. long was made, the rectus sheath incised, the rectal bellies separated and the peritoneum opened throughout the length of the wound. On inspection of the abdominal contents, it at first sight appeared that one had exposed a six months' pregnant uterus, the entire hypogastrium being filled by an elastic fluid-containing tumour. On attempting to retract the intestine for a fuller view, it was found that this swelling was situated *between* the layers of the mesentery of the small intestine, and on further investigation, that it extended retroperitoneally downwards into the pelvis, and to the left into the left iliac fossa where it completely obliterated the iliac colon. The cæcum, ascending, transverse and descending colon were much distended and the pelvic colon flattened and empty.

The tumour was tensely cystic to the touch, and on exploration with a needle and syringe a creamy fluid was drawn off. A diagnosis of chylous cyst was made, and the swelling being packed off with gauze, it was incised and evacuated. Unfortunately, the dish into which the fluid was evacuated was accidentally upset, and the quantity is, therefore, unknown. The cavity was packed with gauze and the abdomen further investigated for any further possible cause of obstruction. None being found, the cyst cavity was marsupialised and the obstruction having been relieved, by gentle milking of the descending colon, the abdomen was closed in layers, with a drainage tube in the cyst cavity and dressings applied and the patient returned to bed.

Temperature 98°F., pulse 102, respiration 30.

After coming round from the anæsthetic, the patient passed flatus by herself. Pilitrin 1 c.c. at once and eserine 1/100 subcutaneously 4-hourly were ordered, and saline and soda bicarb. by the rectum also 4-hourly.

She did well for 12 hours, passing flatus but no motion. At 1 A.M. the night following operation, however, the pulse suddenly failed. Patient rallied under pilitrin but complained of distension, relieved by the passage of the flatus tube, after which she slept. The pulse, however,

again failed at 7 A.M. and the patient failed to rally and died at 7-30. A post-mortem was refused.

The fluid evacuated from the cyst was sent to the Chemical Examiner, Punjab and to the Central Research Institute, Kasauli, whose reports are given below:—

Colonel H. M. Mackenzie, I.M.S., Chemical Examiner, Punjab.—"Centrifugalised and microscopically examined. Only structureless debris can be seen. No cellular elements and no hooklets found. From the colour of the fluid and the description of the cyst, I think, it may be chylous."

Major L. A. P. Anderson, I.M.S., Assistant Director, Central Research Institute, Kasauli.—"The fluid appears to be from a chylous or pseudo-chylous effusion. It contains a high percentage of fat (about 9 gms. per cent.), and also albumose and coagulated protein. It contains no sugar. Microscopically it shows spored organisms—probably contamination from the bottle,—fat globules in large numbers, fatty acid crystals, granular debris and practically no tissue cells of any kind.

The absence of the latter is in favour of chylous as opposed to pseudo-chylous fluid, while the absence of sugar may be against chylous fluid, though in these fluids sugar is not always present."

Remarks.—It may perhaps be permissible to anticipate the obvious criticism that one should not have been content with simple relief of the obstruction but should have drained the bowel as well. Cæcostomy was discussed at the time, and my reliance on the plastic nature of the obstructing mass and on the stimulant effects of pituitrin and eserine on the freed bowel seems, on reflection, to have been an error of judgment, which though it gained time at the operation, may have lost me my patient. It seems clear that the bowels were so intoxicated by three days' obstruction, as to fail to respond to pharmacological stimuli, and that drainage of the cæcum might have remedied the condition.

It is intended to conclude all future operations for the relief of large bowel obstruction by a routine temporary cæcostomy, to avoid if possible this source of error.

It is with no intention of minimising this error of judgment that the conviction is, however, expressed that had skilled nursing, so essential in obstruction cases, been available, the fatal result might have been avoided. These late obstruction cases are the bugbear of the *mofussil* surgeon, and his more fortunate colleague in large towns has great cause to be thankful for his amenities. In the *mofussil* the surgeon is faced with a certainly fatal result if he abstains from interference, and the probability of losing his case from sheer lack of skilled nursing if he operates. It is, perhaps, not too much to hope that the time is approaching when the axiomatic truth will obtain general recognition in India, that it

is at least as important to provide a hospital with adequate nursing as to equip it with instruments and provide a surgeon.

CASE 3.

K. M., æt 60, Mahomedan, male, admitted to hospital on 21st March, 1924, complaining of swelling and ulceration in his left breast.

Previous history.—One year previously he noticed a swelling the size of a walnut in his left breast, which had been steadily increasing ever since. The patient had not noticed any loss of flesh, nor did he complain of any weakness. Enquiry failed to reveal anything in his mode of life likely chronically to irritate the affected region.

On admission.—Patient was a sturdy Pathan giving his age as 60 years, which appearances confirmed. By calling he was a cultivator. There was a hard swelling about the size of a pomegranate in the left breast, the nipple which was markedly retracted, forming roughly the centre of the swelling. There were two ulcerated areas, one on the medial and the other on the infero-external side of the nipple. The margins of the ulcers were irregular, rolled and everted, while their bases were covered with vascular granulations, bleeding freely on touching. The whole tumour appeared fixed to the underlying muscles. There were three enlarged indurated glands palpable in the pectoral division of the axillary group of the same side. The liver, right breast, right axilla and both supra-clavicular regions appeared free. Rectal examination negative, examination of the spine and long bone negative.

Operation.—On 24th March, 1924, radical excision of the breast, sternal portion of pectoralis major, axillary glands and pectoral fascia including abdominal deep fascia as far as the middle line below the ensiform cartilage, by Samson Handley's method. The flaps of skin would not entirely meet at the operation and an area about 1 inch square was left to granulate. On examination the tumour was found to involve the pectoralis major and, when cut, to give the typical "unripe pear" appearance and feel.

Progress.—Three days after the operation three stitches had to be removed to relieve tension on the flaps, leaving a larger granulating surface. Recovery subsequently was uneventful. It is most regrettable that, owing to the advent of the month of *Ramsan*, the patient declined skin-grafting, and left hospital at his own request for his home across the Border, with a clean granulating wound 3 in. by 2 in. and has not since been seen. Reports, however, from his fellow tribesmen received a few days before writing, six months after operation are to the effect that the wound has healed, and that the patient is in good health.

The appearance of the tumour and the glands on operation confirmed the clinical diagnosis of scirrhus carcinoma of the male breast, and the

entire tissue removed was sent to the Central Research Institute at Kasauli for pathological confirmation.

The report of Major L. A. P. Anderson, I.M.S., Assistant Director, is as follows:—"Sections of the tumour present the typical appearance of carcinoma. Involvement of the muscles has occurred at the edge of the growth, but sections of the more distant parts of the pectoral muscle showed no carcinomatous infiltration.

The glands are extensively involved, some of them consisting entirely of tumour material, with no evidence of lymphoid tissue at all."

CASE 4.

F. æt 22, Mahomedan, female, admitted into hospital on 5th July, 1923, complaining of swelling and ulceration of the left breast.

Previous history.—About a year previously patient had noticed a small swelling above and to the inner side of the left nipple. This swelling increased slowly in size until some 3 months later the patient became pregnant. During pregnancy the increase in the size of the tumour became very much more rapid. The swelling softened in two places which were opened, by a native barber, with a slight discharge of thin fluid. The patient had had a child some ten days before admission and with the onset of lactation a further increase of the swelling had taken place and she had come for relief of the dragging sensation and the throbbing pain in the breast. The child was fed entirely from the right breast.

On admission.—The left breast was enormously enlarged being at least double the size of the right lactating organ. On each side of the nipple were two ulcerating areas with irregular edges and unhealthy looking bases exuding a thin watery fluid. The edges of these ulcers were irregular, and, in the case of the inner one, undermined.

The skin was of a typical *peau d'orange* appearance, with a general erythematous blush but below the nipple was a small patch 1 in. by $\frac{1}{2}$ in. where the skin was shiny and much discoloured and which gave fluctuation. The nipple was slightly but definitely retracted, but was not "deviated" upwards and to the left. The tumour, as a whole, appeared to be freely moveable on the deeper structures. There were enlarged glands palpable along the axillary border of the pectoralis major.

There were no enlarged glands in the neck or supra-clavicular regions. The liver and right breast and axilla appeared normal and the right breast was lactating normally; and a recto-vaginal examination was negative, as was examination of the spine and long bones. Temperature 99.4°F. , pulse 92, respiration 18.

Diagnosis.—The appearance of the breast at first sight suggested acute cancer (mastitis carcinosa).

Neither the appearance of the breast nor patient's condition suggested the acute suppurative mastitis of lactation. The softened area and the appearance of the two ulcers threw doubt upon this view, but did not definitely negative it, and suggested a sub-acute inflammatory—probably tuberculous—mastitis, aggravated by lactation: an impression strengthened when one of the ulcerating areas was found to mask a sinus admitting the probe for $1\frac{1}{2}$ in. The glands in the axilla would fit either alternative.

Other, but, less probable, alternatives were sarcoma, with glands in the axilla secondary to infection of the ulcers, and actinomycosis—ruled out by the absence of ray-fungus in smears taken from the sinus.

Operation having been accepted, it was decided to explore the swelling, on the table; and to be guided by what was found.

Operation.—On 6th July, 1923. Temperature 98.6°F. , pulse 88, respiration 18. Under chloroform anaesthesia. The form of anaesthesia is to be regretted, but the services of an anaesthetist familiar with the administration of ether at high temperatures were not available. The softened area was isolated by swabs, and incised, and about 3 drachms of creamy pus containing cheesy granules evacuated.

This seemed to tip the balance in favour of tuberculous mastitis and the cavity was swabbed with iodine and plugged with gauze. Some doubts as to the nature of the tumour remaining in the mind of the operator, the incision of Samson Handley was made from the lower edge of the insertion of the great pectoral slightly convex downwards, ringing the tumour, and downwards and inwards to the linea alba below the ensiform. Skin flaps were undercut and removal of axillary fat and breast from the deep fascia proceeded with. At this stage there was a little difficulty in detaching the breast from the deep fascia, where several cord-like attachments were encountered, which engendered further doubts of the simple nature of the tumour, and only the anaesthetist's report prevented the operation being turned into a radical excision of the breast with pectoralis major.

The patient, weak at the commencement of the operation, was shewing signs of further weakening, and the anaesthetist wished as speedy a termination as possible. The simple operation was, therefore, completed, not without severe misgivings, the axilla drained, dressings applied and the patient returned to bed.

The misgivings during the operation were largely mitigated by subsequent examination of the tumour and axillary glands. The former presented multiple caseating foci between which were interspaced areas of fibrous tissue and of apparently healthy breast tissue, while the latter showed extensive caseation. The specimen, as a whole, was despatched to Kasauli for a pathologist's report.

Pathologist's Report.—Sections of the breast show numerous typical giant-celled systems of tuberculosis. There is a fair amount of fibrosis of the breast. The glands show the same changes in a minor degree.

Progress.—The feeding of the child from the right breast was prohibited for 48 hours to allow of recovery from the anæsthetic. Here a tribute must be paid to the marked devotion—amounting almost to maternal instinct—of the theatre compounder, Mahomed Khan, who developed a sudden and most unexpected aptitude for humanising cow's milk. For 48 hours the child was bottle-fed 3-hourly and the preparation of the milk and the sterilisation of the bottle were voluntarily undertaken by this compounder, whose concern with operation cases normally ceased with their removal from the theatre.

That the experiment was a success—surprising enough to anyone experienced with attempts at artificial feeding among the Indian peasant classes—is solely due to the devotion of this man—to a female child.

Glucose-soda-bicarb-saline was freely administered to the patient during the first 48 hours, after which feeding from the right breast was cautiously resumed. Drainage tubes were replaced by rubber-dam in the axilla after 72 hours and the wound allowed to heal. Recovery was uninterrupted and the patient and her child left hospital on 5th August, 1923.

Remarks.—Samson Handley (1923), whose knowledge of the subject is unsurpassed, says of tuberculous mastitis that it is "a rare disease accounting for only about 1 per cent. of hospital admissions for mammary disease."

This writer further says that in 50 per cent. of cases it forms the only discoverable form of tuberculosis in the whole body.

The case under consideration certainly revealed no other. It also presented several features not in accordance with the usually accepted description of this condition—e.g., the enormous size of the breast (probably due to the super-imposed lactation of the intervening healthy breast tissue) and the general erythematous blush. At the operation the most impressive feature was the firmness of its deep connections with the deep fascia. These unusual features would seem to suggest the possibility that, in Indian patients, in whom tuberculous lesions notoriously tend to a greater relative acuteness and severity than in the European, it is a condition relatively more to be reckoned with. The case under report is certainly an illustration of the wisdom of the procedure advocated by Handley:—Exploration of doubtful breast-swelling on the table prior to deciding between the radical and simple operation.

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APPLICATION OF EXTENSION IN CASES OF SIMPLE FRACTURE.

By P. C. DUTTA, M.B.,

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THE procedure most commonly adopted for applying extension in the so-called cases of "simple" fractures and in most cases of compound fractures is to stick the adhesive plaster either directly to the skin or over a flannel bandage, but neither of these methods proves satisfactory. In the former blisters and sores are the rule, and in the latter, either the bandage slips and hitching against some bony or soft part produces a sore there, or the part below becomes swollen, œdematous and painful.

This led us to think of applying some other form of extension where the bandage will not slip and at the same time extension will not be applied directly over the skin. Firstly, we tried extension from a case of plaster-of-Paris, from a little above the site of the fracture to the required extent below. But this did not prove satisfactory. Then at the suggestion of Lieutenant-Colonel F. P. Connor, I.M.S., I tried the following method with very satisfactory results.

The limb being shaved is painted with glue (the formula is only a slight modification of Sinclair's—the proportion of water being 30 parts, which I thought would be most suitable for this climate); over this a flannel bandage is applied from a little above the site of the fracture to the required extent below. This bandage is thoroughly smeared with the same glue and extension is applied with two strips of flannel or adhesive plaster over the bandage. If flannel strips are used they are smeared with the glue and then applied over the bandage. I think flannel is better and sticks more readily over the moist bandage than adhesive plaster, and I have often used the former in the American method. Over this another bandage, preferably flannel (which can again be used in another case), is applied a little beyond the upper and lower limits of the previous one.

We found the following advantages in this method:—

1. Extension does not slip.
2. The bandage over the skin does not get loose nor slip down.
3. The extension strips not being applied directly over the skin, blisters and sores do not form.
4. Sufficient extension can always be applied.
5. The inner flannel bandage which is soaked in glue, when dry becomes very hard and acts much like a proplastic splint.

One modification which I generally adopt is to apply an elastic bandage for 24 hours at the site of the lesion, reaching well above and below it. This prevents any œdema being formed and causes it to disappear if it is already present.

If extension is applied while this œdema is present it is sure to slip, form blisters, etc., when the swelling subsides.

This method was mainly tried in cases of fractures of the femur, with satisfactory results. The only drawback is that if the knee or elbow is included in the glue-saturated bandage, no proper movement to these joints is allowed when the bandage gets hardened. But this can be avoided by not applying glue at the site of the joints, putting plenty of cotton-wool or simply moistening the part with little water before movement is applied.

ACRIFLAVINE IN OTORRHŒA.

By SHIAM NATH CONSUL, B.Sc., M.B., B.S.,
Jaipur City.

THE treatment of a case of chronic otorrhœa is, indeed, a very ticklish problem to deal with both in hospital and in private practice. It very often tires out the patience of the sufferer as well as the doctor.

In private practice the use of somewhat irritant ear drops, such as boric acid, spirit drops or other spirituous preparations is very difficult and often not possible with many weak and nervous patients after they have once had an experience of the drug.

Naturally under such circumstances one is obliged to use H_2O_2 (hydrogen peroxide), carbolic glycerine or some other ear drop which is both antiseptic and sedative.

In certain cases no doubt this routine treatment is successful in stopping the discharge and alleviating the suffering of the patient, but in most of the cases, especially those of long duration, marked improvement in a short time cannot be obtained by these methods.

For chronic otorrhœa or otorrhœa which has been recently started I have been using a $\frac{1}{2}$ per cent. solution (grs. ii to 1 oz.) of acriflavine in distilled water, and I have found it to be very useful.

The discharge is very appreciably diminished on the very first day and in about a week or 10 days ceases altogether.

I tried the solution on 12 cases, and in 4 cases I found that the discharge stopped altogether within the first week of treatment. In each of these 4 cases, I also know that the discharge has never occurred again up till now. I can only conclude that the others have been cured because they never returned to me after a week. The discharge had diminished to a very great extent when they left off treatment.

The special reason which has prompted me to place this fact before the medical world is that others may also have the opportunity of trying the drug and confirming the efficacy of the same themselves.

If this is proved to be a potent ear drop, I am sure, it will be a very great boon to the

humanity which is suffering from chronic otorrhœa.

Acriflavine fulfils three essentials of a good ear drop, i.e., it is a strong antiseptic, non-irritant and sedative.

The way in which I have been using the drug is as follows:—

(1) The meatus is first syringed out and the pus removed. Then it is further cleansed by instilling a few drops of hydrogen peroxide.

(2) The cavity is next swabbed dry and

(3) a few drops of acriflavine solution are dropped into the meatus with a dropper and a plug of cotton-wool applied.

Once a day usually suffices.

Next day one is apt to find a marked diminution in the amount of discharge and probably it will not be necessary to syringe the ear.

If this course of treatment is followed marked improvement occurs in a few days.

The treatment certainly encroaches to some extent upon the time of a busy practitioner, but its results are decidedly favourable and worthy of trial.

In 11 cases out of 12, I met with uniform results; but in one case where the otorrhœa was also associated with severe eczema of the ear, I found that frequent instillations of acriflavine proved somewhat irritant to the eczematous area which became swollen. However, on reducing the drops to once a day the condition improved.

The solution of acriflavine in the strength indicated is quite non-irritant, but it stains the clothing and the skin if clumsily dropped into the ear, hence it is very necessary to plug the ear after the acriflavine drops are used.

RETENTION OF URINE DUE TO HEMATOCOLPOS.

By MAQBUL ALAM,
*Sub-Assistant Surgeon, Taungdwingyi,
Dist. Magwe, Burma.*

MA KUN, a Burmese girl of about 16 years of age, was brought to the Taungdwingyi Hospital at 10 P.M. on 3rd February, 1925, with a big swelling and pain in the lower part of the abdomen and inability to stand or walk. She stated that she had not passed urine for 4 days. The patient was bed-ridden and had fever. She was treated outside in her village by Burmese physicians, but obtained no relief. One qualified midwife had also tried to pass a catheter before the patient was brought to the hospital but had failed.

On arrival at the Civil Hospital, the patient was put to bed, cleaned up and examined. There was a soft fluctuating swelling in the middle of the lower part of the abdomen, extending up to the navel. The flanks were not occupied. The girl was said to be a virgin and the duration of the disease was stated to be only 4 days. On auscultation no foetal heart and uterine sounds

were heard, so that pregnancy and the other uterine tumours were excluded.

On examination of the external genitalia there was a soft cyst-like tumour protruding outside the vagina, which was ecchymosed with prominent small blood vessels on it. It was larger than a duck's egg.

The meatus of the urethra was not visible. There was some dribbling of urine, as her *longyi* was damp.

On digital examination, I was surprised at not being able to find the vagina. The outlet was entirely blocked by the tumour. Thus I was sure that it could not be a prolapse of the bladder and the anterior wall of the vagina. I tried to push the tumour inside in order to expose the urethral orifice and succeeded in passing the catheter. I drew out 24 ounces of urine. The pubic swelling which extended up to the umbilicus disappeared, proving that this had been a distended bladder. The soft swelling which was protruding out of the vagina remained just the same. On palpation from the top of the tumour, my fingers could not feel any vaginal walls.

Having evacuated the bladder I gave an enema and she passed a good stool. She had not passed any stool for 2 days. Even now the swelling remained just the same, projecting outside the vulva. In the evening again a catheter had to be passed to relieve the bladder which was again distended. On further examination no other general disease was detected, except a slight rise of temperature. Her breasts were fairly developed, which was taken as sufficient evidence of having a normal uterus, though this, like the vagina, could not be felt. She gave no history of the commencement of the menses, but on enquiry, she confessed to having had unusual pains over the back a few days ago.

A diagnosis was made that the thick layer (tentorium) which entirely obliterated the vaginal orifice was a very thick imperforate hymen and that it protruded because of the pressure of the menstrual blood from behind it. An incision was made, which was enlarged afterwards on all sides, and about 8 ounces of retained menstrual blood came out; this contained some small clots. Menstruation continued for another 2 days.

The vagina had dilated much due to the constant plugging by the menstrual flow. The vagina took about 4 days to regain its elasticity.

The uterus and ovaries were now palpable and appeared to be normal. She was unable to walk for 2 days after the slitting of the hymen. She commenced walking with her back bent, due to pressure on the pelvis, on the third day. She was able to micturate freely after this and there was no retention of urine.

She was discharged cured on 8th February, 1925. The interesting points in the case are:—

(1) A thick hymen in a grown up girl of 16, is rarely seen in Burma.

(2) The collection of menses behind the hymen, which was causing retention of the urine, had to be diagnosed from various other conditions.

AN UNUSUAL FORM OF PSEUDO-HERNIA.

By A. BAYLEY DE CASTRO,

Junior Medical Officer, Haddo, Port Blair.

A POLICE-CONSTABLE (No. 3283) of the Andaman and Nicobar Military Police, had apparently been suffering from colicky pains in the stomach, and was advised by his friends to try cupping with his brass *lotah*. As the idea appealed to him, he lost no time in putting theory into practice.

At 8-30 A.M., on the 1st March, 1925, he set a light to some oil in the *lotah*—which was of 4 pints capacity—and applied this over the umbilical region of the abdomen. At 9 A.M., he tried to remove the *lotah* but found to his great surprise that he could not do so. Manipulations were carried out by himself and his friends till 10-30, when the pains becoming very acute, my assistant, Mr. Naidu, was sent for from the Haddo Hospital. He resorted to the first and well-known expedient of letting in some air, and to do this, he bored a hole in the bottom of the *lotah*, but nothing happened. Finally, the man was brought up to the operating room and I was summoned. It was now 11-30 A.M.

I found the *lotah* firmly stuck to the abdomen in the umbilical region. The skin of the abdomen was drawn very tense and puckered up all around the outer rim of the lip of the *lotah*, and so great was the tension that the patient could not lie on the broad of his back. He lay on his side with his knees drawn up to help relax the tension. His expression was very anxious, his forehead was bathed in perspiration, and the pulse was 132 per minute.

He was laid on the floor on his right side, a block of wood was placed under the *lotah*, and after the administration of chloroform, the *lotah* was cut through at its widest circumference with a carpenter's chisel and hammer.

On removal of the base there was revealed a mass which occupied $\frac{2}{3}$ of the interior of the *lotah*. This mass was dark-blue in colour, so thoroughly was it engorged with blood, had blebs on its surface, and felt solid in consistency. Taxis was tried but was absolutely useless; the mass could not be coaxed or in any way expressed through the neck of the *lotah*.

I thought that the herniated area contained, besides the abdominal wall, at least some omentum, if not a loop of gut.

I now made a crucial incision, down to the sheath of the rectus abdominalis in the middle line, and laterally down to the base of the mass. The nearest of the four pieces thus made was now picked up and all the congested blood and serum squeezed out of it. This piece was then

slipped through the neck of the *lotah* and immediately the latter fell off.

The hernia consisted of the entire thickness of the abdominal wall alone. The measurements of the abdominal wall caught up inside the *lotah* was five by six and a half inches, while the area affected up to the outer lip of the *lotah* was seven by eight and a half inches.

As the agency of strangulation was something I have never seen recorded before, I have been prompted to publish these notes.

I must acknowledge that at first I was a bit puzzled about the technique to be adopted in this case.

The patient made an uninterrupted recovery, the wound healed by first intention.

AN INTERESTING SIGN IN RETRO-CÆCAL APPENDICITIS.

By A. G. TRESIDDER, M.D., B.S. (Lond.),

MAJOR, I.M.S.,

Surgeon to His Excellency the Governor of Bombay.

So much has been written on the subject of appendicitis that it would seem almost impossible to note anything new in the symptomatology of this disease. A case, presenting a physical sign which I have not previously observed or seen described, having recently come under my care, I think it may be worth describing the case in some detail.

P. J. M., a Goanese, aged 17, employed as a cook at Government House, complained of pain in the abdomen, of 18 hours' duration, during which period he had vomited three times. On arrival at the dispensary, he was examined by my assistant, Mr. C. M. E. Warner, and it was noted that his pulse rate was 90 per minute and his temperature was 100°F. When seen by me about half an hour later, the patient was lying on his abdomen and on being questioned he explained that he found that this was the most comfortable position in which he could lie. There was some superficial tenderness on pinching up the skin just below the spino-umbilical line, the abdomen was slightly distended and there was pain on deep pressure over the right iliac fossa; there was no rigidity. Rectal examination revealed some tenderness high up to the right but no swelling could be felt.

A diagnosis of acute appendicitis was made and the abdomen was opened through the right rectus muscle. The appendix was found to be in the retro-cæcal position and attached in its entire length to the posterior aspect of the cæcum by strong adhesions, obviously the result of previous inflammatory attacks. The appendix appeared to be embedded in the posterior wall of the cæcum and it was found impossible to effect its separation without first dividing it at its origin from the cæcum. This was done, the stump invaginated and then the body of the appendix was dissected off the posterior aspect of the cæcum. It was embedded in a mass of dense

adhesions, its proximal two-thirds being much swollen and congested while its distal third was acutely kinked on the rest of the appendix, the portion distal to the kink being bulbous and gangrenous. After its removal, incision of the bulbous distal end showed it to contain about half a teaspoonful of brownish and very offensive fluid.

The patient made an uninterrupted recovery.

Such a state of affairs is, of course, quite common in retro-cæcal appendicitis; but the interesting point in the case is the position adopted by the patient, i.e., lying flat on his face and abdomen. Presumably the adoption of this position would allow the cæcum to fall forward and away from the inflamed retro-cæcal appendix, and in doing so, relieve to some extent the pressure on that organ.

In conclusion, I have to thank Major A. N. Thomas, D.S.O., I.M.S., Civil Surgeon, Mahableshwar, for his valuable assistance both during the operation and afterwards.

A CASE OF OBSTRUCTED LABOUR BY AN INTRA-UTERINE TUMOUR.

By M. N. S. CHETTI, L.M. & S.,

Civil Surgeon, Sagaing.

A BURMESE woman about 37 years of age, a multipara with five previous births, was admitted on 15th March, 1925, with severe and continuous labour pains and a history that she had been in pain for the last five days and had lost some blood at home; she had been attended by a Burmese midwife.

On admission her general condition was good. On making an examination per vaginam, a soft tumour about the size of a small coconut was felt in the pelvis—on pushing the tumour to one side there was just enough room for one finger to pass beyond it. On further examination it was observed that the cervix was fully dilated, that the membranes had ruptured and that the head was obstructed in its onward passage by the tumour. The tumour at first appeared like a reduplicated placenta which had been separated prematurely and, as the foetal heart was faintly audible, traction was applied on the tumour; it was found to be firmly fixed to the inner surface of the posterior wall of the uterus. It appeared as if the margins of the folded up placenta were tightly caught between the foetal head and the pelvis higher up, so forceps were applied with the object of extracting the head and the tumour together; this was found impossible. Then the tumour was removed at the level of the posterior portion of the dilated cervix and the child was delivered easily and alive. On introducing the hand into the uterus the placenta was felt distinct and loose and was removed entirely.

The mother and the child did well and left the hospital on the 14th day.

The tumour was sent for sectional examination. The report said that it was a malignant tumour,—a myo-sarcoma—which was likely to recur.

Aug., 1925.]

Indian Medical Gazette.

AUGUST.

PREVENTION OF TUBERCULOSIS IN CHILDREN.

M. LÉON BERNARD and his colleagues have presented a report to the Academy of Medicine of Paris which is of the greatest importance in connection with the tuberculosis of children.

The report deals with the results obtained by a charitable organisation which has aimed at removing infants and young children from homes in which one or both parents are tuberculous.

When a pregnant woman is found to be tuberculous, arrangements are made for placing the newborn infant in a healthy home immediately after birth.

The infants suffer to some extent during the first year owing to artificial feeding, but after that they are quite up to normal standards. In no case among 123 children was congenital or acquired tuberculosis seen, but there was a rather high mortality during the first year of life reaching as high a figure as 38 per cent. in the first three months in one group of infants, but in most cases it was about 12 to 13 per cent. The causes of death were progressive wasting bronchopneumonia and infectious diseases of various kinds, and it is believed that the placing of the infants in groups is not the best means of dealing with them.

In children who had already become infected with tuberculosis from their parents it was found that if the disease was rapidly progressive removal to healthy homes caused a complete arrest of the disease in most cases. The mortality from tuberculosis among 171 previously infected children who were removed from their homes was only 7.6 per cent.

Infected children who were left with their parents usually died of tuberculosis within a short time, the mortality among them being 82 per cent.

Even when good home hygienic conditions prevailed, children left with tuberculous parents almost invariably succumbed to the disease so that it is evident:

- (1) That mild tuberculous infection in infants can usually be arrested by removing the children from the source of infection.
- (2) That persistent contact with tuberculous persons is almost invariably fatal for children.
- (3) That congenital tuberculosis is so rare as to be a negligible factor.
- (4) That inherited predisposition to tuberculosis is of little moment.

It is not likely that much can be done at present in India in the way of removing children from infected homes, but if a knowledge of the facts

is spread there is a possibility that many infants may be saved from inevitable destruction by persuading the parents to send them to uninfected relatives or friends who are living in healthy surroundings and who have no other young children in their homes. A child with arrested tuberculosis is not likely to be a source of danger to other children and it is likely that such a child will be, to some extent, immune, and in later life will have a greater power of resisting the chance infections to which most people are exposed from time to time than a person who has been entirely free from tuberculosis throughout the years of early life.

It is not suggested that infants should be deliberately exposed to infection for the purpose of acquiring this immunity, it is pretty clear that if we do our utmost to keep a child away from infection its chances of escaping the disease will be far greater than if it is allowed to come in contact with tuberculous persons.

The results obtained by the French workers are of great importance in demonstrating that it is usually by repeated infection or by intense infection that fatal tuberculosis is conveyed: if children are removed from the source of gross infection they have an excellent chance of survival, however bad their heredity may appear to be.

THE TRANSMISSION OF DENGUE FEVER.

CLELAND and BRADLEY in 1916 demonstrated that the *Stegomyia* mosquito (*Aedes aegypti*) is able to convey dengue from man to man and that a number of *Culex* mosquitoes tested by them did not convey the disease; their work did not clear up the important question of the period of incubation of the virus in the mosquito.

This problem has now been solved by the admirably conducted experiments of Lieutenant-Colonel Siler, Major Hall and Major Hitchens of the United States Army Medical Corps.

A clear and convincing preliminary report of their work appeared in the *Journal of the American Medical Association* of April 18th, 1925. The first successful experiments in the insect transmission of dengue were by Dr. H. Graham of Beyrouth in Syria in 1903, who reported that he had conveyed the disease to several persons by the bite of *Culex* mosquitoes which had bitten dengue patients several days previously. It now seems to be likely that Dr. Graham was working with *Stegomyia* mosquitoes as well as *Culex*.

Ashburn and Craig's single successful transmission of dengue by a *Culex* mosquito in 1906 has always seemed rather unconvincing as an outbreak of dengue existed at the time of the experiment; the precautions against accidental infection by wild mosquitoes were by no means infallible, and several other experiments carried out at the same time gave negative results.

Cleland and Bradley in 1916 demonstrated quite clearly that *Stegomyia* mosquitoes are capable of conveying the disease from man to

man and their work had hitherto been the only source of accurate knowledge of the insect transmission of the disease. The experiments of Siler, Hall and Hitchens constitute an important advance in our knowledge of dengue and therefore deserve special notice.

The work was carried out in a specially constructed experimental ward of the Sternberg General Hospital at Manila. The *Stegomyia* mosquitoes were bred out in the laboratory, and were allowed to feed by day (9—11-30 a.m.). *Culex* mosquitoes were bred from eggs collected in stagnant pools and were fed by night as they did not feed readily by day; they were more erratic in their feeding habits and shorter lived in captivity than the *Stegomyia* mosquitoes. Extraordinary precautions were taken to prevent accidental infection of the subjects of the experiments by outside mosquitoes, and the volunteers who were selected were recent arrivals in Manila, they had not suffered from dengue previously so far as could be ascertained. They were kept strictly confined in the mosquito-proof ward for 8 to 15 days before being bitten by the experimental mosquitoes and until the end of the experiment. Of 42 volunteers 25 were infected with dengue by the bites of infected captive *Stegomyia* mosquitoes. The negative experiments are not dealt with in the report under review. The incubation period of the disease varied from 4½ days to 7 days in susceptible persons, it never exceeded ten days in any case. The result obtained may be summarized as follows:—

- (1) Dengue fever was produced experimentally in 25 out of 42 volunteers by the bites of infected *Stegomyia* mosquitoes (*Aedes aegypti*, formerly known as *Stegomyia fasciata*). From 2 to 43 infected mosquitoes were used in each of the various experiments.
- (2) The blood of persons suffering from dengue is infective to *Stegomyia* mosquitoes which bite during the first three days of the illness.
- (3) *Stegomyia* mosquitoes which had bitten infective persons from two to ten days previously never conveyed the disease, while mosquitoes which had bitten eleven to sixty-six days previously did convey the disease in 25 cases. The incubation period of the virus in *Stegomyia* mosquitoes was therefore about 11 days under the conditions existing in Manila.
- (4) The mosquitoes which had become infective remained so up till 66 days and presumably they remain infective for the rest of their life.
- (5) Five persons were bitten by *Culex* mosquitoes (*C. quinquefasciatus*) under similar conditions, but remained free from dengue. All of these subsequently developed dengue from the bites of infected *Stegomyia* mosquitoes. *Culex* mosquitoes under the conditions of the

tests were therefore incapable of conveying the disease.

- (6) Twelve persons who had suffered from dengue from 41 to 121 days previously were inoculated with 0.5 c.c. of blood taken from dengue patients during the first or second day of the illness. Seven of these were refractory and the five who developed dengue had attacks of an average duration of 2.8 days as compared with an average duration of 4.8 days in their previous attack. An attack of dengue gives rise to partial or complete immunity for six weeks to four months.

This recent work brings dengue more definitely into line with yellow fever and it becomes more and more surprising that no spirochæte should have been satisfactorily proved to be associated with dengue.

The disease in which Couvy found spirochætes was not typical dengue. The relationship of the virus of dengue to that of sandfly fever is another problem which has to be worked out: it is assumed that the two diseases, though very closely related to each other, are specifically distinct, but so far as is known no conclusive differences have been demonstrated.

It is important to test whether the virus of dengue can be transmitted by sandflies and whether the virus of sandfly fever can be transmitted by the *Stegomyia* mosquito.

If each disease is capable of being conveyed only by one insect a real distinction between dengue and sandfly fever will be established.

SPECIAL ARTICLE.

"PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON HEALTH PROBLEMS IN TROPICAL AMERICA."*

MANY of the larger industrial concerns in world industry have learnt the lesson that "health is wealth," and pioneer among them in the tropics, perhaps, stands the United Fruit Company with its splendid and beneficial record of public health work in tropical America. The conference at Kingston, Jamaica, from July 22nd to August 1st, 1924, was held at the instance of the company and was attended by some 88 delegates, whilst 71 papers were read. Among the English delegates were Dr. Castellani, Sir James Kingston, Fowler, Dr. Arthur Horn, Sir Arbuthnot Lane, Sir Arthur Newsholme, Sir Leonard Rogers, Dr. J. W. Stephens, Dr. J. G. Thomson; Canada sent Dr. Banting; and Germany, Professors Fülleborn and Mühlens; whilst almost every distinguished research worker in the field of tropical medicine in America was present. We do not know whether this wonderful volume of the proceedings is on sale, but many medical research workers in India have received free copies with much appreciation. A conference on the problems of tropical medicine, attended by 88 of the leading medical research

* Proceedings of the International Conference on Health Problems in Tropical America, held at Kingston, Jamaica, 1924. Published by the United Fruit Company, Boston, Massachusetts, 1924, pp. 1010.

workers in the world, lasting eleven days, and at which 71 papers were read was bound to be productive of results. We have no hesitation in saying that this wonderful book is one of the most important contributions ever made to tropical medicine; from cover to cover it is of absorbing interest; almost every paper in it is worthy of abstract and review; whilst the fully recorded discussions are exceedingly valuable. Despite the pressure upon our available space, the great importance of this volume merits a full review.

Tropical Hygiene.—In the opening address Dr. W. E. Deeks spoke of the world-wide warfare against tropical diseases, and was followed by Dr. G. E. Vincent, president of the Rockefeller Foundation, on tropical hygiene as an international adventure. What is the future of the tropics to be? he enquires. The wonderful results of Gorgas in the Panama Canal zone would suggest the possibility of the successful colonisation of tropical countries by white races; yet many authorities consider that this will never be possible, for climatic reasons. A third theory looks forward to a future when the indigenous races will rule themselves, will protect health, encourage education, exploit natural resources, organise industry and commerce and take their places as independent but co-ordinate units in a world system of reciprocal service and co-operation. But, whatever the future, one fact holds good; progress in industry or wealth is absolutely dependent upon progress in public health methods and in the study of tropical medicine. Schools of tropical medicine are becoming more and more numerous throughout the world; in over 450 medical schools to-day investigative work on tropical medicine is being carried on; whilst at least 40 medical journals deal specifically with diseases of the tropics. The establishment of the Health Section of the League of Nations is the most notable step which has ever been taken towards a truly international organisation of public hygiene; all over the tropics large commercial industries are beginning to subsidise health campaigns; whilst the Rockefeller Foundation covers the globe with its network of beneficial activities. The day of the early pioneers ceased some thirty years ago; since then tropical medicine has become an international adventure, and one of ever more and more importance. Yet we are only at its beginning; the future should see the human race organised to fight disease in a manner which has never before been possible.

Dr. J. L. Todd, from McGill University, followed with an address on "Tropical Medicine, 1898 to 1924," an essay which should be read by every medical man in the tropics. In 1898 Ross worked out the mosquito cycle of the malarial parasite, Grassi confirmed and completed his work, "and then the flood gates opened." From then till now scarcely a month has passed without a report of some new important advance in knowledge concerning tropical diseases. The day of the pioneers is over; "it has come to be recognised that the best method of tackling a research problem is to collect together a group of investigators, each with special capacities for dealing with some aspect of the problem, equip them with every facility for their work, place them in contact with their problem, and then leave them alone." That was how the sleeping sickness transmission problem was solved; it will probably be the way in which the kala-azar transmission problem will be solved. Further, in tropical medicine, the use of the microscope and of laboratory methods becomes daily of more and more importance. Many doctors return from the tropics to England to wonder at the unprogressive state of medicine in temperate climates; to ask why the profession at Home have never yet succeeded in finding the ætiological micro-organism of the common cold, or a cure for this universal malady. Actually tropical medicine is to-day probably in a more flourishing state than medicine in the temperate zones. Yet the "time-size" of the world is rapidly altering with increasingly speedy modes of transit; the tropics are the world's sources of food and raw material for

industries, and tropical hygiene is perhaps the most important problem of the future.

Dr. M. J. Rosenau dealt with the seasonal prevalence of disease. Measles, influenza, and other infectious diseases, even infantile paralysis, shew definite cyclical variations in prevalence. Why? The question has not yet been answered, but a consideration of the problem shews how many factors are concerned; the seed, i.e., the prevalence and virulence of the infecting organism; the soil, i.e., the degree of resistance of the population at risk; and the environment. Measles, a mild disease in temperate countries which have long been used to it, may assume virulent characters in a virgin soil. In insect-borne diseases, of course, seasonal variation is marked, and depends upon the seasonal prevalence of the insect concerned; intestinal affections tend to depend upon temperature and humidity factors; crowding, as in the cold weather, is an important factor in respiratory diseases. The seeding of communities with a virus is an important element in the epidemic and endemic prevalence of diseases. In a well-seeded community where equilibrium has been reached, the introduction of susceptible persons will cause an epidemic recurrence both among themselves and among the old residents. The study of epizootics under laboratory conditions is a new angle of approach in the study of epidemiology and should throw much light on the causes of seasonal prevalence.

Malaria.—Dr. C. C. Bass discussed the relation of malaria carriers to malarial incidence, and Dr. W. M. James the localisation of malarial parasites in the body, combating the view that in malignant tertian malaria there is blocking and stasis of the capillaries of the internal viscera; on the contrary there is cerebral congestion and even hæmorrhage, but little evidence of stasis. In the discussion which followed, Dr. H. C. Clark gave the following interesting findings in connection with malaria in pregnancy:—

| | |
|-------------------------------------|----------------|
| Positive mother's peripheral blood: | |
| thin films | 12.9 per cent. |
| Positive mother's peripheral blood: | |
| thick films | 22.5 per cent. |
| Positive placental blood films | 48.3 per cent. |

and pointed out how, in malaria, parasites tended to accumulate in the larger blood spaces and sinuses, rather than to block the finer capillaries. The rib marrow is a site where parasites may often be discovered at a postmortem, when they cannot be found in films from the other viscera. Dr. Castellani drew attention to malarial appendicitis, and Dr. Fülleborn to the prevalence of afebrile malaria carriers: thus Mühlens had found one-third of the school-children in the villages near Hamburg infected, yet without symptoms. Sir Leonard Rogers drew attention to the pioneer work of Ross and Christophers on the connection between malaria and rainfall, to Colonel Gill's well-known work in the Punjab and the great value of his malarial forecasts year by year. Several speakers insisted that quinine is still the best cure for malaria and the best drug for eradicating carriers, but that its administration must be supervised. Dr. J. G. Thomson spoke of the entirely different distribution of species of malarial parasites in different countries; thus in Rhodesia he found that 96 per cent. of infections were with *Plasmodium falciparum*, but, whilst blood films from infected children shewed numerous crescents, films from adults shewed ring forms but no crescents. Professor J. W. Stephens raised several questions; are malarial parasites ever extra-cellular? how does the infection pass across the placenta from mother to foetus, as it has now frequently been proved to do? why is early and primary malaria, utilised as a treatment for general paralysis of the insane, so easy to cure with quinine, whereas old-established and relapsing malaria is so difficult to eradicate? what is the relationship of the parasite itself to "malarial" dysentery, appendicitis and the like? Dr. F. L. Hoffman recorded how he had traversed the intensely malarious tract from the Andes

to the Atlantic shore of South America, fortified by 5 grains of quinine each morning and evening, without contracting malaria. Dr. Greenwood, of the Standard Oil Company of Venezuela, spoke of his introduction of Major Sinton's formula for quinine administration in that country. In summarising the discussion, Dr. Bass said that he had been searching for seven years for a case of malaria which had failed to respond to 30 grains of quinine a day, taken in solution by the patient under supervision (and not merely prescribed by the doctor), and had not found such a case; but it takes eight weeks to reduce the relapse rate to 5 to 10 per cent. Dr. W. M. James drew attention to the necessity for the definition of the term "cure"; was the relief of symptoms meant,—a relatively easy problem; or the eradication of infection in the patient,—a relatively difficult problem? In sections of infected tissue he had found but little evidence of an extracellular location of malarial parasites; whilst he believed that congenital transmission of malaria from mother to foetus only took place by accidental ruptures of the placenta; sections through the placenta of an infected mother will shew myriads of parasites on the maternal side, but none on the foetal side.

Dr. N. P. Macphail, in a paper on modes of administration of quinine in malaria, claimed that for oral administration the more insoluble salts give as good results as the more soluble ones; that quinine gives as satisfactory results when administered twice a day as when given three times a day; that "the intramuscular injection of quinine is an efficient and practical method of quinine administration. The danger of tissue necrosis incidental to the intramuscular injection of quinine is small and insignificant when we take into account its life-saving property." In the discussion which followed Dr. C. C. Bass, whilst agreeing with him with regard to the salts for oral use, disagreed with regard to intramuscular quinine; "the large number of abscesses and the damage to the tissue that occurs in a large percentage of the cases when the injections are made by many different doctors and nurses, is very impressive. It certainly has been quite impressive to me.....It is quite a formidable procedure..... before using this method, the doctor should take a few injections himself." (The reviewer, after an involuntary personal experience of intramuscular cinchonine bishydrochloride in malaria, entirely agrees with Dr. Bass. There are few procedures more painful.) Dr. R. C. Connor, Ancon, Canal Zone remarked that intravenous quinine was safe if the doctor who gave it had been instructed in the necessary technique. Colonel J. Cran spoke of a 20 years' personal experience of intramuscular quinine and was a warm advocate of the method for critical and severe cases. Dr. W. M. James spoke of the numerous parties who disappear into the malarial hotbeds of South America with no accompanying doctor, armed only with insoluble quinine pills, the members of which return to Panama within a few days "ready for the cemetery." His own experience was that abscesses occurred in about 0.5 per cent. of intramuscular injections of quinine.

Drs. M. A. Barber and W. H. W. Komp then read a paper dealing with an exceedingly ingenious method of simultaneously taking thin and thick blood films in malarial survey work. From each child examined a thin film and a thick film are taken simultaneously on the two halves of the same slide. These are marked with a number and dropped, one by one, into the usual pattern of slide box. Strips of cardboard of suitable thickness are now inserted between each two slides, and the box inverted when the films have dried. On removal of the inverted cover of the box, the slides plus cardboards are bound into a bundle with a strong rubber band. They are now dipped thick film end downwards to half their length—whilst still held together by the rubber band—into a bath of Giemsa's stain; 1.25 c.c. to 75 c.c. of water; stained; gently washed; allowed to dry, and examined. As a rule only the thick film is examined; but if necessary, the thin

film on the other half of the slide can be stained and examined subsequently. Dust must be avoided in the technique and a good brand of stain is essential. Dr. H. C. Clark spoke of having tried this technique in 1,431 cases; the Barber thick film technique gave 46 per cent. of positive findings; whereas thin films from the same patients taken at the same time gave only 17.5 per cent. of positives. The chief disadvantage of the thick film method, however, was the difficulty of recognising young ring forms; whilst, actually, owing to the great prevalence of malaria in certain localities, the discovery of a malarial infection in a patient by the thick film method might lead to treatment of the malaria and overlooking of the primary disease concerned.

Dr. F. M. Johns spoke of the results of an extensive investigation into thick film methods in connection with the Rockefeller Foundation anti-malarial campaigns. He advocated taking a thick and a thin film upon the same slide, using less than one drop of blood for the former, dehaemoglobinising with acetic acid alcohol, and staining with polychrome methylene blue, followed by eosin. The discussion clearly shewed that, whilst many workers are strongly in favour of the thick film method, there is as yet no unanimity as to the best technique.

Blackwater Fever.—Papers on blackwater fever and haemoglobinuria followed next. Dr. J. W. Stephens first gave a concise and very admirable exposition of our present knowledge of the disease,—a paper which summarises to some extent his admirable series of recent publications on the same subject in the *Annals of Tropical Medicine and Parasitology* of recent years. Dr. J. G. Thomson followed with an account of the morphology of *P. falciparum*, as found in association with blackwater fever in his recent enquiry in Rhodesia, the results of which were reported in the same journal. He believes:—(1) that blackwater fever is always associated with the malignant tertian parasite, the instances of association with the benign tertian and quartan parasites being in all probability, merely instances of mixed infections. (2) The geographical distribution of blackwater fever depends upon the geographical distribution of the three (or more) different species of malarial parasites; it is a disease of countries where *P. falciparum* predominates, as in Rhodesia where over 96 per cent. of the infections are with this species. (3) The virulence, and to some extent, the morphology of this species of malarial parasite appears to vary from time to time and from one area to another, and in some instances we get relatively large ring forms, 2.5 μ or so in diameter, together with marked stippling and degeneration of the infected red corpuscle. (4) It is apparently this altered chemical reaction of the red cells which is responsible for the production of blackwater fever by this parasite. These altered cells appear to act as foreign bodies capable of producing a haemolytic amoebocyte, and this haemolytic substance will act only on cells so altered. Pernicious stippling and altered staining reaction of the corpuscles are the chief features associated with blackwater fever; where such findings are present in an area, there blackwater fever exists; where they are absent, it does not. The morphology of malignant tertian malarial infection appears to be different, for example, in England and Rhodesia; but whether this is evidence of the existence of two different species of malignant tertian parasite must be left an open question.

There followed, as might have been expected, an exceedingly interesting discussion. Dr. W. M. James hoped that the solution of the blackwater fever problem would ultimately be found in the laboratory; at least the clinician appeared to be incapable of solving it. In the Panama Canal zone they had found the closest relationship between malaria and blackwater fever. The labouring negro population took no advantage of the screened huts provided, but they were more or less immune to malaria, and shewed but little malaria and little blackwater fever. The American staff took the

fullest advantage of screening against mosquitoes, and also had but little malaria and little blackwater fever, but from causes different to those in connection with the negro population. The "poor whites," labourers, etc., from the countries in Southern Europe were non-immunes, took but little trouble in anti-malarial measures, and were heavily affected with malaria and shewed the chief incidence of blackwater fever. Further, the incidence of blackwater fever corresponded to rainfall, and the local Panamanians were nearly immune. Some 80 per cent. of blackwater fever cases shewed the presence of *P. falciparum*, and when the medical history sheets of such as shewed *P. vivax* came to be examined, it was frequently found that they had previously shewn *P. falciparum* also. He agreed entirely with Dr. Thomson that blackwater fever was a manifestation of malignant tertian malaria, under certain circumstances. His treatment for the disease was prayer; there was nothing more difficult; cases with and without quinine did equally well or equally badly; finally the clinician must be on the lookout for malarial cases with temperature charts suggestive of a plateau, often with a continued fever resembling that of typhoid fever. Dr. C. C. Bass thought that, whilst the best treatment of blackwater fever might be prayer, its best method of prophylaxis was prophylactic quinine for the susceptible individual. Dr. Castellani considered that the term blackwater fever covered three entirely different conditions:—(1) A manifestation of malignant tertian malaria under certain circumstances; (2) quinine hæmoglobinuria, and (3) a small residuum of some 2 to 3 per cent. of cases which might be an entirely different type of disease having no connection with malaria; "as a general rule, however, blackwater fever is malaria." Dr. R. R. Nutter believed that prophylactic quinine as usually administered was often insufficient to prevent malaria, but an important ætiological agent in the production of blackwater fever. Dr. H. C. Clark spoke of the postmortem findings in 66 cases in the Canal zone. The incidence was chiefly in males, and the greatest age incidence at 20 to 40 years of age. Cases occurred chiefly among Spanish immigrants who had resided from 1 to 7 years in the Canal area. He was "reasonably sure that blackwater fever is a sequel of æstive-autumnal malaria due to *P. falciparum*. Professor Stephens, in closing the discussion, said how disappointed he was in the extraordinary unanimity of opinion shewn; he had expected a variety of views as to the causation of blackwater fever; whereas the discussion had shewn a complete unanimity in accepting its malarial origin.

Dr. F. M. Root then read a paper on American anophelines, and Dr. J. A. Le Prince one on Anopheles control. In the latter are some very interesting figures. In the U. S. A. the public pay the manufacturers of metal screening against mosquitoes some 25 million dollars a year; but, owing to defective screening often fail to get value for their money. In Panama mosquito traps had proved a success; so also had providing special anopheline breeding places which could be used as bait for mosquitoes, and then drastically dealt with. Top minnows and other suitable fish were not used nearly as much as they should be. The bionomics of Anopheles mosquitoes required further study. Paris green, used as a cloud spray, was one of the most effective and cheapest remedies for breeding places. Instances were quoted where engineers had given extravagant quotations for the cost of anti-malarial measures, but where the medical men on the spot had been able to devise effective measures at one-twentieth to one-fortieth of the cost. In brief, mosquito control could be so cheapened by the devising of suitable measures for different areas as to become a practicable proposition even for a poverty-stricken country. Dr. H. R. Carter enlarged upon the same theme. It had cost about \$1.05 per head to rid an area in North Carolina of malaria, but the business organisations concerned estimated that this expenditure had been saved ten times over in the improved public health.

Municipalities might be slow in learning the lesson that anti-malarial measures pay, but he had found that business organisations were not; they were becoming increasingly interested in public health measures as a paying proposition. Dr. Seale Harris spoke of one company which had reduced the incidence of malaria among its employees from 2,000 cases a year among a population of 100,000 to less than 150 cases a year. The Rockefeller Foundation's anti-hookworm campaign in the Southern U. S. A. had awakened the states concerned; to-day they placed public health measures in the forefront of their programme.

Yellow Fever.—A series of papers on yellow fever by Dr. H. Noguchi and his colleagues followed next, and revealed a wide divergence of opinion in the discussion which followed. In Brazil Dr. Noguchi and his co-workers have isolated *L. icteroides* in 2 out of 9 cases of yellow fever, the virus producing typical symptoms in inoculated guinea-pigs, monkeys and dogs. Sera from convalescent Brazil patients gave typical positive Pfeiffer reactions with strains of the same organism as isolated from cases in Peru, Ecuador, and Mexico. An amount as small as 0.0001 c.c. of an immune serum from horses protected guinea-pigs against 1,000 minimum lethal doses of infected guinea-pig kidney. Dr. H. R. Muller contributed a detailed account of the histopathology and hæmatology of experimental yellow fever in animals shewing how parallel are the findings to those of yellow fever in man. Lieutenant-Colonel J. Cran, R.A.M.C., dealt with the results of the use of Noguchi's serum and vaccine in an outbreak of yellow fever at Belize in British Honduras, where 17 cases occurred in a college. Every other inmate of the college was given the vaccine and the buildings were fumigated. Finally all inmates of the college were segregated on an island where there were no stegomyia, some 12 miles distant. Some 500 persons in the town were also vaccinated, and among these no case occurred. Three cases occurred in the town amongst those not vaccinated. The 17 cases were all treated with Noguchi's serum; of 13 which received the serum on the 1st or 2nd day, only 1 died; of 4 which received it on the 4th to the 6th day of illness, all died. The Rockefeller Foundation came to the rescue and carried out a most vigorous anti-mosquito campaign. Within a few months the mosquito index had fallen from 50 per cent. to within the 5 per cent. index which is regarded as the safety line, and has remained at the lower figure since.

Dr. A. Agramonte drew attention to the rôle of children in maintaining endemic conditions; he trusted that, with the introduction of Noguchi's vaccine, sanitary officers would not neglect other and more useful measures. *L. icteroides* was a most interesting organism, but he doubted its specificity and its causative rôle in yellow fever. One of the most curious features of yellow fever was its spontaneous tendency to apparently die out, only to reappear again in the endemic areas. The quarantine regulations were most essential in the campaign against the disease. In reply, Dr. Noguchi referred to the failure of Lebrado and Hoffman in Havana to isolate *L. icteroides*. Their guinea-pigs had shewn leucocytosis and probably a secondary infection had occurred; whereas in his own experimental animals the symptoms were typical of yellow fever. Morphologically *L. icteroides* is thinner and shorter than *L. icterohæmorrhagicæ*, whilst the serological reactions of the organisms are quite different. Dr. H. R. Carter said that the difference in symptoms between guinea-pigs inoculated with *L. icteroides* and *L. icterohæmorrhagicæ* differed in degree, but not in kind. Earlier brews of vaccine had contained agar and caused severe abscesses. To estimate the value of a vaccine the data must be comparable. "It is all very well to vaccinate a man, and then have him develop no yellow fever. But unless for vaccination you can get two groups of men, one unvaccinated, and the one vaccinated, the other unvaccinated, and both groups equally exposed to yellow fever, you cannot judge of the efficacy of

vaccination." The evidence was suggestive of the value of the vaccine, but did not provide proof. Dr. Noguchi then gave further figures collected from different districts: in Mexico in September to December 1920, 19 cases treated with serum with 3 deaths as against 57 deaths in 106 untreated cases; in Tuxpan a severe outbreak occurred between August and December 1920, with 86 cases; 2,000 persons were vaccinated between October 7th and November 5th and 16 of them contracted the disease, but in every instance the patient was incubating the disease when vaccinated. Major H. J. Nichols accepted *L. icteroides*; in fact he considered that the organism was first seen by Stimson in 1905 in sections of the kidney of a case and named by him *S. interrogans*. Lieutenant-Colonel J. Cran said that when he compared the 1921 epidemic in Belize with the 1905 one the difference reminded him of the difference in the treatment of diphtheria before and after the use of antitoxin.

After a paper by Dr. R. H. Carter, on preferential and compulsory breeding places of *Aedes (Stegomyia) aegypti*, Professor Fülleborn read an exceedingly interesting paper on the blinding filaria of Guatemala, (*Onchocerca caecutiens* Brumpt, 1919). Dr. F. G. Rose recorded the treatment of filariasis by Bayer 205: it was found to cause a sharp initial rise in the number of microfilariae, followed by a pronounced fall, which, however, is only of a temporary character, though it may be noted from time to time for 2 or 3 months.

Amoebiasis.—Drs. W. M. James and W. E. Deeks next contributed an admirable paper on the aetiology, symptomatology and treatment of intestinal amoebiasis. In 1914 these workers were the second to establish clearly the difference between *E. coli*, as a harmless commensal living in the colon, and *E. histolytica* as the parasite of amoebic dysentery, thus confirming the work of Walker, 1911 at Manila. Their view that *E. histolytica* is normally a parasite of the lumen of the gut and only pathogenic when it takes on tissue-invading powers is novel, and completely at variance with Dobell's view that in the carrier state the entamoebæ live in the mucous membrane of the colon and in nests in the sub-mucous tissue. Intestinal amoebiasis is protean in its symptomatology and acute and sub-acute dysentery are not its most common manifestations. The small strains of *E. histolytica* are most important and their small "minuta" cysts those most often missed in laboratory examinations. The use of human faeces as garden manure is an important factor in the spread of endemic amoebic dysentery in the Canal zone. Turning to symptomatology, latent infections are found most frequently in children. In adults reflex digestive disturbances are common, and the cæcum and appendix are frequently infected; often, on deep palpation, localised and fixed points of tenderness may be elicited in the colon. Colicky pains, with or without constipation—most frequently with alternating constipation and diarrhoea—are common. Appendicitis, cholelithiasis, renal colic and even diverticulitis may be simulated by an amoebic infection; mild cases are often mis-diagnosed as "mucous colitis," and in many such cases repeated examination of the stools may be required before the entamoebæ are found. Repeated and severe hæmorrhages from a small lesion may lead to a mistaken diagnosis of malignant growth in the colon. A severe type of local invasion may almost completely block the lumen of the colon, and palpable masses resembling tumours may result.

The standard treatment adopted by the authors for amoebic dysentery is as follows:—(1) Absolute rest in bed. (2) A generous milk diet, which will leave practically no residue in the colon. (3) Saline or warm water irrigations one to three times a day as lavage. (4) Bismuth subnitrate, a heaped teaspoonful, or about 180 grs. every three hours, suspended in a tumblerful of water,—lessening the amount only when improvement takes place. In very chronic cases, bismuth administration may have to be continued for 2 or 3 months after convalescence is established. The suspension in

water is necessary to prevent the bismuth from forming a paste or solid mass. Resumption to a normal diet must be gradual and be as carefully controlled as with a typhoid patient. (5) Emetine hydrochloride, $\frac{1}{2}$ to 3 grains a day hypodermically or orally until the limit of tolerance is reached. Under this régime, the case mortality at Ancon Hospital has fallen from 6.2 per cent. in 1914 to 1.7 per cent. in 1923. In 66 cases observed for some months after the conclusion of treatment, relapses occurred in only $4\frac{1}{2}$ per cent. Finally, the treatment is essentially a hospital one, and only suitable for in-patients under full control.

Drs. C. Garin and P. R. Lépine commented on the increase of amoebic dysentery in France among the civilian population since the war, owing to the introduction of infection by colonial troops. Relapses are common, anæmia is often marked, whilst the suprarenal glands are often affected, and the adrenalin content low. Different new remedies were tested. (1) A standard treatment for amoebic dysentery, of 50 cgms. stovarsol daily, for the 1st and 3rd weeks; supplemented by emetine during the 2nd and 4th weeks, and finally followed up by 25 cgms. of stovarsol daily for a further 1 or 2 months. No *E. histolytica* were found in the stools after the 8th day, whilst infections with *Giardia* also disappeared, but not those with *Trichomonas*. (2) Acetylarsan, a white crystalline powder, readily soluble in water, was also found to be of value in amoebiasis: 6 or 7 doses, each of 75 cgms. in solution are given at 3 to 8 day intervals. Entamoebæ disappeared slowly after the 8th day, but *Giardia* infections were at once cleared. Both drugs appear to be but very little toxic.

In the discussion following these papers Sir Leonard Rogers said that in the severe amoebic dysentery of the tropics the rule should be emetine first and arsenical preparations second. Dr. R. C. Connor said that there were very few laboratory men really competent to diagnose cysts of *E. histolytica*. He rarely exceeded 9 grains in any course of emetine injections and preferred intermittent courses of injections to overdosing the patient with emetine. Sir Arbuthnot Lane spoke of chronic dysentery cases which had returned to England and whose symptoms had cleared up after operation and division of "the first and last kink" and cure of their intestinal stasis. Dr. Fülleborn drew attention to the difficulty of sterilising fresh vegetables and green stuff in the tropics. Dr. Agramonte spoke of the reduction in dysentery mortality in Cuba following a vigorous conservancy campaign. Dr. Kofoid spoke of constipation as a symptom of intestinal amoebiasis, and described his laboratory technique in examination for cysts. Sometimes as many as 30 and 40 negative examinations had been followed by a positive. In one case continuously observed for 46 days the number of cysts passed per day varied from nil to over 800 million. Aerial dust, rather than water-supplies, was the mode of transmission of the cysts. Americans returned from tours in the tropics shewed more than double the carrier incidence shewn by those who had stayed at home. Dr. Nichols referred to Boeck's recent successful cultivation of *E. histolytica* in vitro. The part that Vedder had played in the introduction of emetine should receive recognition. One grain of emetine a day for 10 days was enough to make a person feel as if he had locomotor ataxia; the administration of the drug must be controlled and watched. Dr. S. Harris spoke of the value of infusions of green vegetables in treatment. Colonel Ashford described a case of pleural effusion due to *E. histolytica*, following upon an old liver and lung abscess which had occurred years before: the exudate on the pleura was "a mass of amoebæ." Dr. A. R. Paterson spoke of the dangers of bismuth poisoning by absorption through an ulcerated gut. Dr. Ureta advocated 3 to 5 grains of ipecac in a gelatine capsule at bedtime for discharged cases. Dr. A. A. Facio had seen a case of peripheral neuritis follow large doses of bismuth; the blood picture was very much like that in lead poisoning. Professor Mühlens

said that at Hamburg they had been driven to yatren in preference to all other treatments: dose 1 gram or 15 grains 3 to 4 times daily for one week, by the mouth; or a daily enema of 200 c.c. of a 2 per cent. solution. The patient must be taught to retain the fluid as long as possible. The results were admirable, especially in emetine-resistant cases.

Drs. R. W. Runyan and A. B. Herrick then read a paper on the surgery of amœbiasis. In two instances they record what is apparently true amœbic abscess of the appendix. The appendix was often a resting nidus for entamœbæ which had survived the emetine treatment, and which re-invaded the colon; appendicectomy might cure a chronic amœbiasis. In 4 cases chronic amœbic infection of the cæcum had led to the formation of large tumour-like masses with almost complete blocking of the lumen of the gut. In 3 of these recovery followed after operation. Cæcostomy was to-day but rarely necessary, even in severe cases. For liver abscess they advocate open incision and drainage,—(a recommendation with which we think that few medical men in India to-day will agree). Abscess of the brain is usually very rapidly fatal. In the pre-emetine days they had seen cases of cæcostomy followed by destruction of large areas of the abdominal wall by *E. histolytica*.

Sir Leonard Rogers followed, with a paper on amœbic hepatitis. During the last two decades, he claimed, our advance in knowledge of this subject has surpassed that in almost any other branch of tropical medicine. He described how he had shewn the close relationship between liver abscess and amœbic dysentery, had demonstrated the living amœbæ in the walls of liver abscess cavities, and had re-introduced the ipecac treatment which had been used by McLean, Norman Cheevers and the early pioneers, but which had then gone out of fashion, and been replaced by ammonium chloride with disastrous results. The operative mortality in those days of open operation for liver abscess varied from 50 to 60 per cent. in British station hospitals to 70 per cent. in civil hospitals. Work followed on the leucocytosis in amœbic hepatitis, and the recognition of the pre-suppurative phase. Turning to the rational present-day treatment of amœbic hepatitis, the emetine treatment must be begun before surgical intervention and carried on until the amœbæ are all killed. The following are some of the figures quoted which shew the enormous improvements effected by Sir Leonard Rogers' work:—

- (a) Rogers, Lettsomian lectures, 1921. Records of 2,661 cases treated by open operation in pre-emetine days. Mortality 56.8 per cent.
- (b) Ibidem. 111 cases—mostly advanced ones—treated by aspiration with trocar and cannula plus emetine. Mortality 14.4 per cent.
- (c) K. K. Chatterji. 186 cases treated by aspiration, irrigation plus emetine. Mortality 1.6 per cent.
- (d) The mortality in the British army per 100,000 from liver abscess in 1898 to 1907 was 139; in 1908 to 1912 was 51; in 1913 to 1920, after the introduction of emetine, was 19. Only one case of liver abscess in 29 cases of dysentery occurred in 1912 to 1919 as against a proportion of 1 to 8 in 1908 to 1911.

Dr. J. J. Valarino then read a paper, illustrated by admirable photographs, on the value of x-rays in estimating the extent of amœbic ulceration of the colon. The value of the opaque meal and radiographic study in cases of chronic amœbic ulceration is very great. The parts affected in order of frequency were the cæcum, ascending colon, hepatic flexure and sigmoid colon. Dr. H. C. Clark gave an account of the amœbic lesions and complications found in 186 postmortem examinations between 1905 and 1923. In 55 instances the entire colon was involved, in 48 the entire colon and appendix, in 24 the cæcum and ascending colon. Taking cases with only early ulceration, the primary seats of election appeared to be in order of frequency the cæcum, the ascending colon, rectum, sigmoid and appendix. The

transverse colon was least affected; 76 cases shewed amœbic ulcerative appendicitis, resulting in 9 per cent. of cases in abscess or perforation. 95 of the cases shewed liver abscess. Rather unexpectedly 55 of these were multiple as against 40 cases with solitary abscess. A tribute to emetine therapy was the fact that the number of cases of amœbiasis per 1,000 postmortems had dropped from 61 in 1907-1910 to 3 in 1920-1923.

A paper by Drs. Kosoid, Boyers and Swezy followed dealing with systemic infections by *E. histolytica*. The entamœbæ, as is well known, tend to spread into the capillaries and veins of the colon submucosa, and so to be swept to the liver and brain, where they lodge and cause tissue necrosis with abscess formation. But, though this may be the usual sequence of events, they may also lodge in other organs, and they have been found by the authors in the bone marrow in a case of arthritis and in the lymph glands in cases of Hodgkin's disease. (The authors' criteria that the forms seen were entamœbæ and not tissue cells are that they shewed persistence of the nuclear membrane in karyokinesis and 6 chromosomes, with 12 in mitosis,—characters foreign to any tissue cell of man. Motile amœbæ were apparently not observed). The parasites apparently have a special affinity for mesenchyme and connective tissue regions. This amœbic septicæmia may lead to most unexpected sequelæ: rheumatism, chronic invalidism in middle age, iritis, etc., whilst entamœbæ have also been found in the testis, semen, spleen and in skin ulcers. The routine examination of patients' stools for cysts is hence a most valuable measure.

Intestinal Flagellate Protozoa.—Dr. R. W. Hegner gave an interesting account of experiments on the control of intestinal protozoal infections in rats by change of diet. No ciliate infections have ever been reported in carnivorous animals, whereas they are very common in ruminants; flagellate intestinal protozoa are also rare in carnivora. In rats parasitized with intestinal flagellates it was found that a change to a purely carnivorous diet eradicated or greatly reduced these infections. In one patient with diarrhœa and a *Trichomonas* infection, both the diarrhœa and the flagellates disappeared entirely after 3 days' treatment, and all findings were negative for the next 32 days. In the discussion which followed, Dr. Kosoid drew attention to the pathogenicity of *Pentatrichomonas* as compared with other species of *Trichomonas*, and to the fact that rats could be cleared of their natural intestinal protozoal infections for experimental purposes by feeding them with bread soaked in Epsom salt solution. Dr. Seale Harris sounded a note of warning with regard to feeding patients on a purely carnivorous diet; it would only be possible to carry this on for a few days. Dr. W. E. Deeks considered that there was not sufficient evidence to incriminate the intestinal flagellates as pathogenic; correct the diet and the patient with diarrhœa gets well but may still shew a flagellate infection. His routine treatment was 15 minims of dilute nitric acid with $\frac{1}{2}$ a drachm of essence of pepsin before meals.

Bacillary Dysentery.—Drs. R. C. Connor and L. B. Bates then read a paper on bacillary dysentery as observed at Ancon Hospital during the past five years. The spread of this disease they believed to be wholly due to carriers; the water and milk supplies and conservancy methods were irreproachable. On routine plating of stools from all cases of enteritis from 1918 to 1923, 66 cases of bacillary dysentery had been discovered, the age incidence ranging from 3 months to 59 years. Most of these occurred in October, November and December, and 19 died. Of the infecting strains 39 were of Flexner-Y type, 4 of Shiga type, 18 of the Sonne type, and 5 of undetermined type. Children are especially susceptible to bacillary dysentery, and the disease is very fatal among them. Ten per cent. of cases were not diagnosed during life, but only at post-mortem. The carrier state might persist up to at least the 4th month of convalescence after bacillary dysentery. Treatment of the disease was symptomatic. In

hospitals special care should be taken to prevent the spread of the disease to other patients. "Many physicians in the tropics do not seem to be aware of the frequency and seriousness of bacillary dysentery, especially in infants and children."

Dr. W. H. Park mentioned that sometimes the Flexner type of bacillus could cause epidemics with quite severe symptoms. Dr. Castellani described the characters of the Sonne bacillus, *B. metadysentericus*, which produces acidity but no gas in lactose when recently isolated; also of his *Vibriothrix zeylanica*, with colonies identical with those of the dysentery bacilli on MacConkey's medium. For children he advocated the rhubarb treatment:—pulv. rhei. co. 1 to 2 ozs. in 2 ozs. of chloroform water; shake the bottle and give one teaspoonful every 2 hours to a child 2 years of age. The dysentery quickly clears up. Unfortunately this treatment is not so successful in adults. Dr. H. J. Nichols considered bacillary dysentery to be the most important military medical problem in the Philippines. Cyto-diagnosis was the most rapid method of diagnosis. Dr. W. H. Park commented on the manufacturer's habit of labelling a serum "polyvalent" without stating what strains it is potent for. Serum should be kept on ice. Dr. P. W. Wilson drew attention to an outbreak in Haiti, from which carrier emigrants might carry the infection to other countries. In summing up the discussion, Dr. Connor remarked "what we are trying to do is to get the doctor to think in terms of bacillary dysentery whenever he has to deal with a gastro-intestinal upset, especially in children."

Inguinal Granuloma.—Dr. J. Iturbe then read a paper on *Schistosoma mansoni* infection in Caracas, describing its life history and its transmitting snail host of genus *Limnæa*. Dr. F. M. Johns followed with a paper on inguinal granuloma, claiming it to be due to Donovan's organism; this is an organism of Chlamydozoal type, plump, rounded and glistening in fresh preparations; staining badly; so far not cultivated with success; and found in intracellular masses in the endothelial cells of the granuloma. Treatment with tartar emetic, 5 to 12 c.c. intravenously of a 1 per cent. solution at 2 to 3 day intervals until the lesion has healed, was said to be strikingly successful. After the 5th or 6th dose the "Donovan bodies"—(which are quite different from *Leishmania donovani*)—disappear. Complete healing of the lesion however, may take from 1 to 3 months. Interrupted courses of treatment might prove better than one long continued one. All attempts to transmit the disease to animals had failed. Dr. J. G. Thomson pointed out that the constant finding of an organism associated with a pathological condition did not prove that it was the cause of the disease; thus harmless spirochetes are very common in granulomatous lesions. Dr. Noguchi had found a minute spirochete, *Treponema genitalis*, in many similar lesions, but had failed to produce lesions with cultures of it in animals. Dr. C. C. Bass drew attention to the great prevalence of inguinal granuloma in hospital cases, and Dr. R. W. Runyan to the frequency of mixed venereal lesions,—chancreoid often being complicated by syphilis.

Leishmaniasis.—A very important paper on certain biological aspects of Leishmania, by Dr. H. Noguchi followed—one which should be read in the original by all workers upon Leishmania infections in India. He first described his medium for the cultivation of Leishmania:—

| | |
|--------------------------------------|-----------|
| 0.9 per cent. saline | 80 parts. |
| Fresh rabbit serum | 10 parts. |
| 2 per cent. nutrient agar, pH 7.2 .. | 10 parts. |

Rabbit hæmoglobin (made by taking 1 part of defibrinated blood with 3 parts of distilled water) 1 to 2 parts.

Upon this medium Leishmania grows luxuriantly in its flagellate form; the surface scum of 2 to 4 mm. thickness can be periodically skimmed off, and consists of herpetomonads; and the culture will remain viable

for several months. Rabbits had been immunised by repeated intravenous injection of massive doses of active cultures, and their sera used in the preparation of further media. It was here found that when the medium was prepared with heterologous serum, the cultures remained clear and translucent, but in homologous serum the cultures became granular in appearance from agglomeration of the flagellates. The serological reactions of the different strains establish three different species as valid, *L. donovani*, *L. tropica*, and *L. brasiliensis*, parasites respectively of the viscera, cutaneous tissues, and muco-cutaneous tissues. *L. infantum* gives the same serological reactions as *L. donovani*, and is presumably identical with it.

Turning to biochemical reactions, distilled water instantly plasmolyses Leishmania,—(which accounts for the fact that diluted Giemsa's stain is quite unsuitable for dehaemoglobinising a thick film of blood from a suspected kala-azar case). The pH range of growth was from pH 5.08 to pH 7.21, but *L. tropica* grew even up to a pH of 8.8; *L. donovani* only up to a pH of 7.21. Saponin kills the flagellates at a 1 in 10,000 dilution. Cobra venom, activated by lecithin, killed at a 1 in 20,000 or even higher dilution. Tartar emetic kills the flagellates at a 1 in 100 dilution, but some flagellates survived at 1 in 1,000. As with the trypanocides so with tartar emetic, the drug appears not to become leishmanicidal until it is activated by union with the products of living tissue. Bismuth compounds proved very weak. The action of salvarsan and other arsenical derivatives was also investigated.

Finally, however, a drug was found with a very striking leishmanicidal action in neutroflavine, a derivative of acid acriflavine, (prepared by the National Aniline Co., 40 Rector St., New York City). At a 1 in 50,000 dilution this compound kills Leishmania: but if the mixture of flagellate culture and dye be exposed to a bright light, neutroflavine kills the flagellates at a 1 in 10,000,000 dilution,—a very striking photodynamic effect; and it is the short-length light waves and not the heat waves that bring about this effect. Further, the dye is almost completely devoid of toxicity for man, and after intravenous injection in the rabbit is still present in the circulating blood 2 hours after administration, but not at 20 hours. It is obvious, in conclusion, that we may have in this dye a drug of extreme value in the treatment of oriental sore, possibly also in the treatment of other Leishmania infections.

Finally, Dr. Noguchi had examined the Leishmanias of various Euphorbia plants in South America; also those of Hemiptera found feeding on infected plants. Morphologically these herpetomonads were found to be distinguishable from the herpetomonad forms of Leishmania of man. All attempts at culture had failed, and immunologically the serum reactions were quite distinct from those of the Leishmanias of man.

It will be seen that Dr. Noguchi's valuable paper constitutes a most important addition to the literature of the Leishmania problems. It was followed by a paper by Dr. Castellani advocating the treatment of oriental sore by phosphorus.

If the lesion is extensively ulcerated B. P. phosphorus oil is applied on a swab to the fundus and margins of the sore, at first every day, later at intervals of 2 to 3 days. If the nodule is not ulcerated, or only slightly so, in addition to the external application, 3 to 5 minims are injected into the nodule and into the skin around it once or twice a week. Seven cases had been treated with satisfactory results, and apparently complete cure in from 3 weeks to 3 months.

An interesting discussion followed. Dr. J. W. Stephens spoke of a case of oriental sore where a mistaken diagnosis of rodent ulcer had been made. The reports on the result of treating oriental sore by tartar emetic intravenously were very conflicting. Dr. H. R. Carter raised the possibility of there being two Leishmania infections in Brazil; espundia, indigenous to the country; and oriental sore, introduced into it from the Mediterranean. He had seen a large number of cases

of typical and often multiple oriental sore; and in some 40 to 50 per cent. of them espondia followed, and caused terrible deformity and even death.

Tropical Dermatology.—Dr. A. Castellani then introduced the subject of tropical dermatology. For axillary trichomycosis he advocated applications of 1 per cent. formalin to the armpits several times a day, with sulphur ointment used at night. The aetiology of mango toe was described; a good routine treatment consists of the application once or twice a day of 2 per cent. potassium permanganate lotion, followed by a boracic tale dusting powder. *Tinea flava* he differentiated from *tinea versicolor*, and reports ointment and turpentine as useful. *Tinea imbricata* was amendable to formalin applications. *Tinea imbricata* was a disease shewing no tendency to spontaneous cure and its treatment is very difficult: the best routine remedy was resorcin (1-2 dr.) dissolved in tinct. benzoninae co. (1 oz.) or chrysarobin ointment. A new type of blastomycosis cutis was described, clinically resembling acute furunculosis, but due to a yeast, and yielding only to massive doses of potassium iodide and autogenous vaccine. Pruritus ani is sometimes of mycotic origin, and this type shews no tendency to spontaneous cure: cautious applications of silver nitrate (grs. xv) in spir. aetheris nit. 1 dr.) were recommended. Dr. Connor drew attention to the relapsing character of dhobie's itch; the best preventative is the routine use of an alkaline dusting powder (sod. bicarb $\frac{1}{2}$ oz.: tale powder 8 ozs.) after the bath.

Drs. C. S. Butler, J. E. Houghton and G. F. Cooper contributed a paper on mycosis of the hands and feet. Such infections are world-wide. As the result of a questionnaire sent out to 500 officers and men of the U. S. Navy, 34 per cent. were found infected with fungi somewhere or another on the body, with an average duration of the lesions of 1.4 years. Methods of examining for, isolating and cultivating the different causative fungi were then described, and a full account of their morphology and cultural characters given. Treatment of these conditions, to be effective, must be continuous and prolonged; the resting and spore forms are deep in the epidermis, and until this has desquamated the infection will persist. Soap is useful, tincture of iodine for epidermophytosis of the pubes and axilla, and permanganate lotions where suppuration has occurred. *Linimentum saponis* is also very useful, used as a local application at night.

Dr. E. Urueta next read a paper on pinta, and Dr. A. A. Facio a very interesting one on ainhum, illustrated by skiagrams. The latter affection may affect other toes than the little toe, the chief radiographic finding is atrophy and disappearance of the middle phalans, whilst sections of the diseased tissues shew marked sclerosits and partial obliteration of the arteries and marked infiltration with mast cells.

Tropical Surveys.—Professor Mühlens gave an account of a parasitological survey of some districts in the northern part of the Argentine. Examination of 7,024 persons' blood by the thick film method shewed malarial parasites present in no less than 2,331; all three species of parasite being fairly prevalent. Over 30 per cent. of the population are infected, in some schools up to 70 per cent., in some labour camps up to 100 per cent. Microfilariae abounded; in some regions 48 per cent. of the population are infected, the microfilariae are present in the peripheral blood both by day and night. The parasite is either *F. demarqui* or a new species, *F. lucumana*. Trypanosomiasis, on the other hand, was very rare, only 2 cases having been encountered. From one of these cases it proved possible to infect a mouse, although no trypanosomes could be found in thick blood-films. In the discussion which followed, Dr. Noguchi mentioned the possibility of cultural diagnosis of obscure cases of trypanosomiasis by using his leptospira culture medium.

Dr. A. E. Horn, delegate from the British Colonial Office, spoke on some aspects of tropical medical work.

Malaria was of course the biggest problem in medical matters in the Empire. Thus Mauritius, once a health resort, was now saturated with malaria: Fiji and Rodriguez islands had still escaped. And each district had its own problem: ill-considered or indiscriminate measures were useless: the local problem had to be studied. In Malaya in some places jungle-clearing in order to get rid of *A. umbrosus* resulted in providing breeding places for *A. maculatus*, a still worse carrier. Temporary expedients might be utilised where funds were short. He described Fletcher's valuable work on different methods of quinine administration in malaria, —(reviewed on p. 153 of the *Indian Medical Gazette* for March, 1924). In African villages where the water-supply may sometimes be scanty, shallow wells constitute numerous breeding places for *Anopheles*; stocking with fish is better than oiling. Mosquito-proof wire gauze is a bad method of screening wells and water-supplies and receptacles, as it sooner or later gets broken or rusts. Instead an *Anopheles* net designed by Dr. Horn, and made by Messrs. J. & Co., 110 Cannon Street, London, E.C.4 is much more suitable. Finally, with regard to West Africa, the incidence of yellow fever required investigation.

Sir James K. Fowler referred to the disappearance of malaria in the English fen country, and Professor Mühlens to its renewed prevalence in North Germany since the war. Dr. J. A. Le Prince had found mosquito "swatting" a useful measure in the Canal zone. Wire screening should not contain more iron than half of the 1 per cent. of alloy in the copper bronze used. He had heard of areas where there were supposed to be no *Anopheles*, yet when a horse was taken there as bait, it took three people all their time to collect the *Anopheles* that arrived to feed on it. Dr. Bass insisted that for the effective cure of a patient with malaria a course of 8 week's quinine treatment was absolutely necessary; and a further discussion took place on quinine therapy.

Dr. L. Beeche then described the health problems of Costa Rica and its public health organisation. In 1874 to 1890 when the railway from the capital to Port Limon was constructed, its course was literally strewn with corpses, as the result of epidemic malaria. Thanks to the work of the United Fruit Co. the countryside was now healthy and filled with a vigorous population. Yellow fever swept the country in periodical epidemics. In 1899 even reaching altitudes of 3,116 feet above sea-level: the disease has now been conquered and no cases have been reported since 1910. Dysentery, however, still contributes at least 2 per cent. of the total mortality, and 50 per cent. of the population harbour hookworms.

Framboesia.—Dr. A. R. Paterson then dealt with the use of bismuth salts in yaws in connection with the anti-yaws campaign in Kenya colony. Towards the end of 1920 a large-scale campaign against the disease was instituted. In 1921 the number of patients treated with novarsenobillon was over 7,000: in 1922 it was over 25,000; but the cost of the novarsenobillon used was over £4,000 in the latter year. The campaign was proving so expensive that it was not clear where the funds were to come from. The value of potassium-sodium bismuth tartrate, containing about 54 per cent. of bismuth, was accordingly investigated. Its toxicity was very low and it was found to be an efficient spirochaeticide. A dose of 0.6 gm. of novarsenobillon costs 3s.; the cost of the corresponding dose of the equally efficacious bismuth salt was 1/10th of a penny. The cost of treating 25,000 patients with bismuth was £15 as against a cost of £4,000 for novarsenobillon.

A discussion on yaws followed. Dr. Nichols described his early and well-known studies of the effect of salvarsan upon *T. pertenue*. Yaws and syphilis were quite different, and the former yielded more readily to treatment than the latter, also the two diseases differ in their clinical manifestations in experimental rabbits. Dr. P. W. Wilson related the history of yaws in Haiti. It was imported into the island in the early slave days, and the economic loss annually from it is now enormous. In

a population of 50,000 in one area there were over 5,000 cases: with a total population of 2½ million in the island heavily infected, one could readily appreciate what an anti-yaws campaign was going to cost. The use of the bismuth salt, however, might render it practicable, even on an extensive scale.

Dr. Castellani spoke of conditions in Ceylon. In 1903 there were districts where it was impossible to get any labour, 80 per cent. of the children were infected, 30 per cent. of the adults, and the number of cripples was simply appalling. All that is changed now. With regard to differential diagnosis, late cases might be difficult, but "ring-worm" yaws was quite different from a circinate syphilide. Mercury was also useless in yaws. The chief drugs used in the campaign had been salvarsan, neo-salvarsan and Castellani's tartar emetic mixture. In summing up the discussion, Dr. Paterson mentioned that so far they had used the bismuth salt only by the intramuscular route.

Plague.—Plague was the next subject discussed. Dr. A. R. Paterson gave an account of the history of plague in Kenya Colony. Present in Central Africa at least as early as 1894, it was imported into Kenya in 1902. The local rodents are *Rattus rattus* (two subspecies), *Rattus norvegicus*, and *Rattus couba uganda*, a Uganda species with 10 pairs of mammae on the abdomen of the female. The first was the all-important rodent in connection with plague, and there had been a regular steady invasion across country by this species, taking plague with it. In 1913 this wave reached the Yala river and there halted: plague was then prevalent only south of the Yala. In 1919, however, *Rattus rattus* crossed the Yala, and plague began to appear with it. In 1921 a survey was made by Mr. van Someren, who found that *Rattus rattus* was everywhere, that the natives regarded it as a species which was new to them, that it was ousting the indigenous Uganda rat. Several plague foci were discovered.

The most strenuous anti-rat campaign was now started, chiefly in North Kavirondo district where there had been between 1,500 and 2,000 deaths from plague in 1919. The chiefs and the inhabitants were called together and were informed by the District Commissioner that he would return in 4 days time and count the rats which they had collected. The indigenous African likes amusement, and he has apparently taken to rat destruction with zest. At the meeting on the 4th day, 5,697 dead rats were brought in by a large crowd of men, women and children, and the *tamasha* was completely successful.

After this, matters were organised on a large scale. The chiefs now collect the tails in bundles, and at district headquarters the tails for the district are counted and destroyed once a month. No rewards are given. Each chief is held responsible for an average of 5 tails per hut per month; if his tally falls short of this number he is "told off" for slacking. To a large extent rat destruction has now become a habit and part of the civilisation of the people. Destruction of rats is so planned as to start at the periphery of the infected areas and work towards the centre.

The campaign has now been in operation for nearly 3 years. What are the results? Plague was much less prevalent in the area in 1922 than in 1921, but this may have been due to other causes. The problem of carrying out rat destruction over an area of 4,152 square miles is obviously a difficult one; but many millions of rats have already been killed. Yet Dr. Paterson concludes that, even with this intensive campaign, so far as reducing the level of the rat population is concerned, "the campaign has probably been without effect." There are two possibilities: (1) infected rats may be being eliminated; or (2) an immune generation of rats may be being eliminated. The first would lead to the suppression of plague; the second, to its increase, and would do more harm than good. Only the future will shew which of these two possibilities is being accomplished; but at least it will now prove easy to start a very intensive campaign at short notice in any area.

Ankylostomiasis.—Dr. B. E. Washburn dealt with the economic value of a hookworm campaign. In the Vere area of Lower Clarendon Parish in Jamaica, a campaign was conducted during 1920. In 1915 to 1919 the average number of patients treated in the government hospital of the area was 78; in 1921 it was 57; in 1922 it was 52; and in 1923 only 45: whilst the number of beds in the hospital had been reduced from 80 to 50, with an approximate saving of £1,100 per annum. In 1919 the infestation rate in the area was 48 per cent.; on a re-survey in 1922 it was only 6 per cent. In Spanish Town there was a similar campaign in 1920-21. The number of cases of typhoid fever dropped steadily from 76 in 1919 to 29 in 1922 and 6 in 1923, a saving of £300 per annum on nursing, etc., in connection with this one disease alone. A questionnaire was sent to seven managers of estates on which anti-hookworm campaigns had been carried out; every one of them replied that there was an enormous improvement in their labour force; several of them assessed the increased output of work at 25 per cent. or more; intestinal diseases' incidence had markedly decreased; whilst the labourers' habits had become more sanitary. Many letters from cured patients were received telling of improved health and higher wages. Some of these epistles are quite amusing, (and recall a good story told by Dr. McVail. He had cured a boy of hookworm infection, and three weeks later the boy's father came to see him. "Sahib" implored the father, "please do not treat any of my other children, because that boy now eats so much that I cannot afford to feed him"!)). The results of the Jamaica campaign have been of marked economic value from the standpoint of the community, of the employer of labour, and of the individual.

Dr. Ashford said that formerly in Porto Rico they used to have terrible infections, on an average from 1,000 to 1,500 worms per patient, and ankylostomiasis accounted for one-third of the mortality, the total mortality being 42 per mille. Some 517,000 were treated out of a total infected population of 600,000. The results were amazing: the average hæmoglobin index rose from 43 per cent. to 72 per cent.; the death rate fell to 21 per mille; and the export trade of the island had improved from 8½ million dollars in 1900 to 80 million dollars in 1923. Sir Thomas Oliver mentioned the occasional outbreaks in the Cornish mines; it was supposed that ankylostome larvae could not survive in the low temperatures of British coal mines, but he had found that they would withstand freezing. In Germany spraying with water was introduced in order to keep down the coal-dust and prevent explosions, but this had resulted in increased hookworm infection. When the Mont Cnri tunnel was constructed there was a heavy mortality among the workmen from ankylostomiasis: when the Simplan tunnel was constructed, the stools of every single workman were examined, and in the construction of this tunnel, 14 miles long, not a single death occurred from ankylostomiasis. Dr. Kofoed shewed from regimental records during the war how such epidemic diseases as measles were more prevalent among a lightly infested population with hookworms than among those hookworm-free. Tests shewed the mental efficiency of those infested to be 25 per cent. lower than that of those who were hookworm-free. Professor Fülleborn said that, whilst it was practically impossible to eradicate hookworm infection among coolies, yet it was practicable to so reduce the degree of infestation that immense improvement in general health took place; in some of the Dutch East Indian plantations the annual death rate among the coolies had fallen from 4 per cent. to 0.5 per cent. as the result of anti-hookworm measures.

Splenectomy.—Dr. B. M. Phelps commented on the neglect of splenectomy in the tropics. It is a valuable measure in pernicious anæmia, if not undertaken too late in the disease. He reported details of a case of splenectomy for a dislocated and enlarged malarial spleen which was causing pain and disability. The direct results were excellent, but the patient died elsewhere two years later, the cause of death not being stated. The possibility of sub-total resection of the spleen, as in operations on

the thyroid, was suggested. Dr. F. M. Johns reported excellent results after splenectomy in a case of pernicious anemia. Dr. E. I. Salisbury reported on a case of a dredge operator, found drunk and taken to jail; three days later it was realized that the man was acutely ill, with symptoms of an "acute abdomen." The spleen was found to be ruptured, and splenectomy was done with excellent results. Dr. Phelps drew attention to Krumhaar's monograph on the subject, a record of 1,077 splenectomies for various causes, but with only 117 cases of probable cure.

Eye Diseases.—Dr. D. F. Reeder, in a paper, drew attention to the association of retino-choroiditis with an unbalanced diet in the tropics. Excluding cases due to syphilis, diabetes, Bright's disease and focal infections, such as sinus disease, there remained a residue of cases where the aetiology was obscure, but where a low carbohydrate diet gave excellent results. Colonel Ashford, Dr. R. C. Connor and Dr. W. M. Janes also gave accounts of similar cases. Dr. M. Arango discussed trachoma and pannus. He differentiated folliculosis from trachoma, although admitting that intermediate stages might exist. Follicular conditions of the conjunctiva were more marked in school-children and especially after the infectious fevers; 60 per cent. of them showed enlarged tonsils, but very few of them errors of refraction. As contrasted with folliculosis, in true trachoma the elasticity of the conjunctiva is lost, there is hypertrophy of the membrane, which bleeds readily, trachoma follicles are present, and the secretion is watery, thin and acrid. Acute trachoma, so-called, is trachoma plus infection superimposed. Trachoma in its usual form is slightly contagious. Pannus trachomatous appears frequently in the form of vascular keratitis, but infiltration with adenoid cells in the layers of the cornea had also been observed. With regard to the control of trachoma, early diagnosis, isolation of the infected children, and disinfection of discharges and soiled articles were advocated.

Acclimatization in the Tropics.—Dr. F. L. Hoffman discussed the problems of mortality and acclimatization in the tropics. "It is my deliberate judgment that the main reason for the backward condition of the tropics is that, in a general way, these fertile regions have not as yet been drawn upon by modern nations as a matter of imperative necessity, and as sources of a needed food supply. When that time comes, the difficulties, which are now largely a matter of academic discussion, will tend to rapidly disappear." Reckless writers on tropical exploration had greatly exaggerated the climatic disadvantages and had created a general impression in America that the tropics were unduly unhealthy. The classical example of the construction of the Panama Canal ought to disabuse people's minds of such a view. The United Fruit Co. in 1923 employed in its tropical possessions 9,651 white persons and 44,986 coloured persons, including the families of employees. Its medical department had supervision of 158,213 persons. The death rates were 9.12 per mille for the white employees and 13.85 per mille for the coloured employees. Malaria was responsible for 38 per cent. of the admissions to hospital; dysentery was an important element in the death rate; venereal disease was perhaps next in importance to malaria; cancer showed an incidence of only 0.67 per mille of the employees.

With regard to acclimatization of the white population, the first essential was a dietary study; most Europeans consumed a diet very unsuitable to the tropics. Most Europeans who died in the tropical area concerned died from non-tropical diseases. Steady work and regular exercise were important factors in keeping the white population fit. The abuse of alcohol was a most important cause of ill-health; whilst venereal diseases were a source of infinite mischief. Fourthly, every effort must be made to avoid parasitical infections, particularly malaria and ankylostomiasis. Science and engineering were conquering climate; if the white man could not be made fit for the climate, the climate might be made fit for him.

Sir Thomas Oliver spoke of the immense improvement of recent years on the Gold Coast of Africa, once regarded as "the white man's grave." Colonel Ashford contributed an interesting analysis of the causes of ill-health among a white population in the tropics; "there are people who come to the tropics who are unhappy because they cannot see the land they visit turned into a cheap imitation of the particular place from which they come, there are northern people who live in the tropics and have never known the soul of the tropics." Another important factor is nostalgia; a man from the North should have a change of environment every second year. A third element was the necessity for sufficient rest; the indigenous tropical inhabitant works "in low," whereas the immigrant white usually works at high pressure until he breaks down. Exercise was very important. Heat and humidity lowered the functional efficiency of the endocrine system in the white; the blood pressure falls and there is increased retention of nitrogen in the blood. Children should go Home undoubtedly. Dr. H. R. Carter drew attention to the many different climatic conditions present in different tropical areas. In the Canal zone they had found that the stenographers, teachers and nurses who did regular work kept well, whereas the housewives who idled all day were constantly on the sick list. Alcohol was of tremendous importance; it probably knocked out some 67 per cent. of the immigrant Americans and 32 per cent. of the British; "take all the exercise you can and as little whisky as you can" was a good motto for the white man in the tropics. In summing up the discussion, Dr. Hoffman spoke of loneliness as a very important cause leading to drink and gambling; fatigue was often due to lack of interest; there were certain psychological classes of persons who should never go to the tropics at all.

Sprue.—Sprue was the next subject to be discussed. Dr. Ashford said that, whilst typical sprue was unmistakable, there was a common class of case with a symptom-complex of disordered digestion, acid dyspepsia, constipation with occasional diarrhoea, diminution in the size of the liver, a shallow complexion, lowered blood pressure, asthenia and moderate loss of weight, sometimes a sensitive tongue and general nervous instability and irritability which was not sprue, but was not unlike its early phases. In none of such cases was *Monilia psilosis* found. In sprue this picture was still further enhanced, and *Monilia* could be found; he had even isolated it in such cases complicated with vaginitis or proctitis.

In typical sprue the enormous frothy stools might contain as much as 50 per cent of unabsorbed fat; abdominal pain was complained of in 40 per cent. of cases; nausea present in 43 per cent.; and in 25 per cent. occasional vomiting. Haematemesis and hyperchlorhydria are sometimes seen. The pathology of sprue was that it was an "atrophic inflammation." Sallowiness and anaemia were marked features, and in probably no other tropical disease was the loss of weight so rapid. An analysis of the urinary and blood chemical picture was then given in detail. Of 1,435 cases of sprue, two-thirds of them of moderate or severe grade, *Monilia psilosis* has been isolated in 83.7 per cent. The age incidence was chiefly between 20 and 40; 59 per cent. of the patients were females; and whilst it was the old resident chiefly who contracted sprue, there were numerous cases in persons who had been in the tropics for only a very short time. Sprue is an urban disease in the tropics, and is almost absent from rural areas. Socially it is a disease of the intellectual and well-to-do classes.

The underlying factor in the disease is nutritional unbalance. In Porto Rico, where sprue is very prevalent, the island, 3,606 square miles in extent, was inhabited by a population of 1,300,000 persons and most of its area given over to sugar, coffee and tobacco cultivation. The crops of foodstuffs grown on the island were hence very scarce, eggs and poultry only seen in the towns, succulent green vegetables a rare commodity and the milk supply very scanty. As a result the diet in general

was defective in proteids, mineral salts,—especially calcium salts, and in vitamine A. The food deficiency in the island had created a vicious food habit, and carbohydrate excess resulted. It was on this basis that sprue supervened. To some extent, the disease appeared to be communicable.

Bacteriologically, the characters of *Monilia psilosis* were well established; those of *Monilia (Oidium) albicans* were not. The former was virulent to guinea-pigs, and the virulence could be greatly increased by passage. Finally a virulent strain was produced which, when administered in the food, caused fatal fermentative diarrhoea and buccal excoriation in these animals. The serological reactions of the organism also tended to incriminate it as the causative agent of sprue.

An interesting discussion followed. Dr. Castellani spoke of cases which had occurred in temperate climates, and the need in children of differentiating it from coeliac disease. He considered the role of the *Monilia* to be probably secondary. There was such a condition as true blastomycosis of the intestine, but the stools were quite unlike those of sprue and at postmortem ulceration of the gut was found. Most patients do well on a milk diet, but some 20 per cent. cannot stand a milk diet, and then a meat diet should be given. Large doses of bicarbonate of soda were often very useful. Sir Leonard Rogers said that he had usually found an oral streptococcal infection present in cases of sprue, and that the use of autogenous streptococcal vaccines had given very good results. Of 20 such cases so treated and followed up for at least a year after completing treatment, 18 remained well and at work in the tropics. (One patient whom the reviewer has personal knowledge of in this series developed sprue after he retired from India to Scotland, and reversed all the accepted canons of procedure by coming out from Scotland to Calcutta for treatment, and made a sound recovery on streptococcal vaccine and careful dieting.) Subsidiary lines of treatment are to administer vitamins, especially vitamine B in yeast or marmite; strawberries in the diet; bismuth salicylate and Dover's powder to control the fermentative diarrhoea. Dr. J. W. Stephens spoke of the difficulties in diagnosis; typical cases were easy to diagnose, but there was a big borderline group, which might or might not be sprue. Indicanuria is supposed to be a sign of sprue, yet is common in quite healthy persons. Acid saliva—another supposed sign—"is an exceedingly common normal phenomenon." Regulation of the diet and castor oil are useful measures in treatment. (The reviewer knows of one patient with sprue who tried a large round of eminent consultants, and then gave it up. He next treated himself for six months with regular small doses of castor oil taken systematically, and was apparently completely cured, or else recovered spontaneously.) Dr. Agramonte spoke of the importance of rest; he would not undertake a case unless he could send the patient to bed. Dr. Ashford, in closing the discussion, insisted on the primary rôle of *Monilia psilosis*; tetany is seen in some 25 per cent. of cases; as regards the differential diagnosis from pernicious anaemia, there is not the same rapid wasting in the latter disease; the dietetic syndrome is apparently the background of the picture in sprue, but does not account for its aetiology; 95 per cent. of cases may be allowed a liberal diet, the other 5 per cent. must have either a whole milk or whole meat diet. Calcium salts, pancreatin and diastase are useful remedies in treatment.

Pellagra.—Dr. Seale Harris next read a paper on pellagra. He concluded that an unbalanced diet does not seem to be the only factor in the aetiology of this disease, but it is an important predisposing cause, a diet low in vitamine C and unbalanced, with an excess of carbohydrates being the underlying picture. In treatment a full diet, rich in vitamins, particularly vitamins B and C, with a low carbohydrate content, and eliminating cane sugar entirely is important. The true cause of pellagra has still to be discovered; it is probably due to an infectious agent of some kind.

Insulin.—Professor F. G. Banting followed with a paper on insulin, which constitutes a classic; in nine brief pages he here presents a concise and authoritative summary of the subject; indeed it constitutes—to quote a hackneyed phrase—"what the physician ought to know about insulin." In diabetes mellitus the functional ability of the islet cells of the pancreas is impaired by nerve strain, infections, changes in blood supply, over-activity, etc., and there is no reserve. In such individuals therefore, when sugar is given in large amounts, it remains circulating in the blood stream at a higher percentage and for a longer time than in normal individuals. This increased percentage of sugar in the blood is recognised by the kidneys, and sugar is excreted in the urine. The hyperglycæmia thus produced gives rise to thirst; the large amount of fluid consumed to combat the thirst gives rise to polyuria. Since the tissues are under-nourished from failure to burn sugar, there is increased demand for food, and hence excessive hunger. The increased intake of food throws a still greater strain upon the insulin-producing mechanism and there results a vicious circle of disease, with consequent emaciation. Hence the classical symptoms of the disease. Acidosis supervenes; in children and young adults the disease is usually rapidly fatal; in adults of middle age and in old age the development of the disease is slower.

The fundamental principle in treatment is to give only the minimum amount of carbohydrate necessary for life and to give it in such a form that the pancreas can deal with it; whence the Allen, Woodyatt, Wilder and other special diets. The basal requirement of the individual in diet is about 25 calories per kilo of body weight per day. Protein and carbohydrate can supply 4 calories per gramme, fat 9 calories per gramme; but the rôle of fat is limited by the fact that without carbohydrate it cannot be completely oxidised, and that of protein by the fact that 46 per cent. of it may produce ketone bodies, and 56 per cent. of it may be converted into carbohydrate.

Complete co-operation between patient and physician is the first essential in treatment. The patient must be taught elementary urine analysis and the calculation and preparation of his diet. The full history of the case should be enquired into, and a complete physical examination made, especially with a view to discovering any possible focus of chronic infection, which must be dealt with if found. He is then placed upon a basal diet for 3 or 4 days or until the urine is sugar-free. As soon as he becomes sugar-free or when the blood-sugar level reaches normal, the caloric intake is gradually increased until sugar appears in the urine; if he remains sugar-free or has a normal blood-sugar content on a diet containing 700 calories over and above his basal requirements, the case does not need insulin.

If insulin is required, a beginning should be made with a dose of not more than 5 units twice a day; which should be given 20 to 30 minutes before the morning and evening meals in order to combat the hyperglycæmia following the food intake. If three meals a day are taken the morning dose should be larger than the evening one, in order to cater for the midday meal as well as breakfast. When the dose of insulin and diet are so balanced that the patient's blood-sugar is normal, they are concurrently increased until the required amount of food is reached. If too large a dose of insulin be given, symptoms set in in from 1½ to 6 hours, usually about the 3rd or 4th hour. Unaccountable anxiety, restlessness and profuse perspiration are first noticed followed by hunger, clonic tremor, pallor of the skin, a rapid rise in the pulse rate to 120 beats per minute, rapid fall of blood pressure, dilatation of the pupils, aphasia, then collapse, unconsciousness, convulsions and finally death may occur. The immediate treatment should be to at once administer glucose as orange juice, or sweetmeats, or if the symptoms be severe to inject adrenalin, which combats the insulin effect.

In the case of a patient admitted with diabetic coma, the urine should be obtained by the catheter and rapidly analysed, together with a rapid analysis of the blood-

sugar. Whilst these tests are being carried out, the bowels should be evacuated by copious enemata. If sugar and acetone are present in the urine in large amounts, from 30 to 50 units of insulin should be immediately given subcutaneously. The patient usually regains consciousness in from 3 to 6 hours. The next stage is the need for caution. Blood and urinary sugar should be frequently estimated in order to guard against insulin over-dosage and the danger of hypoglycemia. The patient should now take fluids and glucose by the mouth—at least 200 c.c. of fluid per hour. The next day the white of an egg in 200 c.c. of orange juice may be given, or protein every 4 hours, until the patient is on a balanced insulin-diet treatment; he is thenceforward treated as an ordinary diabetic.

Not only is insulin the sheet-anchor in the treatment of diabetes mellitus, it will convert bad surgical risks in such patients into good ones. But "insulin is not a cure for diabetes; it is a treatment."

Dr. Seale Harris congratulated Dr. Banting on his simple but masterly exposition of the subject. In Birmingham they had treated over 100 cases with insulin during 18 months and had kept careful records. Cases of coma and gangrene which formerly would have died had been saved, and operations rendered possible which otherwise could not have been attempted. Hyper-insulism was caused by over-ingestion of sugar, until finally the islet cells having become worn out, hypo-insulism set in, with diabetes in its trail. Such diabetics often shewed obesity due to over-eating preceding the onset of diabetes. Dys-insulism might also follow infection of or trauma to the pancreas. Ulcer of the stomach or duodenum might lead to co-existing disorder of the pancreas. With hyper-insulism might go hypo-adrenalism, whilst with disturbance of the insulin mechanism might also go disturbances of other endocrine glands.

Cancer.—Sir Arbuthnot Lane then read a paper on the causation of cancer, summarising in a few pages his well-known views on the correlation between chronic intestinal stasis and cancer. A considerable discussion followed. Sir Arthur Newsholme enquired why, if cancer was especially associated with constipation, should cancer of the tongue be five times as prevalent among males than among females, who are in civilisation at least, the more constipated sex? Also why is there more intestinal cancer among males than among females? Sir James Fowler said that it was very difficult to over-emphasise the importance of local irritation. There was a general policeman, the general defensive mechanisms of the body; and a local policeman, the local resistance of the tissues; the latter might be put out of action by local irritation. Cancer is uncontrolled cell activity, and when we know more about the causes of cell activity and cell health, we may know more about the origin of cancer. Sir Thomas Oliver hoped that, as we are now able to grow cells and tissues apart from the body, thanks to the researches of Carrel and others, we might soon be in a better position to tackle the cancer problem. Dr. F. L. Hoffman confirmed Sir Arbuthnot Lane's views as to the rarity of cancer in primitive races. In San Francisco he had found that a considerable proportion of the men who died from cancer had been exposed to smoke or fumes in industrial occupations. On the other hand in investigations in Eastern Bolivia he had never come across a case of cancer of the breast.

Alastrim.—Dr. L. M. Moody described an epidemic of alastrim in Jamaica. Clinically the disease in general resembles mild small-pox, but the rash is even more profuse. There are two types of lesion in the rash; either large and discrete pocks, or pocks which are small and closely set; sometimes a mixture of both types occurs in the same patient. The course of the rash is rapid, and in many cases in 14 or 15 days the crusts have separated. Mortality was very low; 13 deaths only in 2,912 cases; including 2 deaths in pregnant women. The disease is transmissible to the fetus in utero. Vaccination of contacts proved a very valuable measure in prophylaxis, but does not appear to

give absolute protection. Dr. M. J. Rosenau said that he did not consider the differences between mild small-pox and alastrim sufficient to warrant regarding the latter as a separate disease; it was well known that small-pox epidemics varied very greatly in virulence. Vaccination and other measures against the so-called alastrim should be as vigorous as any taken against small-pox. Dr. W. H. Park drew attention to Brill's disease as a mild type of typhus and its analogies with the relationship of alastrim and small-pox. Dr. Castellani advocated 1 per cent. solution for the face and painting with . . . for the limbs in treatment.

Leprosy.—Leprosy was next discussed, the subject being introduced by Sir Leonard Rogers in a paper on treatment; which is a model of what such papers should be, concise, yet clear and informative. He outlined the history of the evolution of the ethyl esters in the treatment of leprosy. In former times all sorts of remedies were in vogue, mineral preparations, iodine in various forms, local treatment of the lesions, sera, tuberculin, the naitin treatment, vaccines of acid-fast bacilli—none of which was probably the true lepra bacillus, and vaccines made from excised leprosy nodules. But the one remedy which had stood the test of time is chaulmoogra oil, originally produced from the seeds of *Tournefortia kurzii*, but now also obtained from *Hydnocarpus wightiana* and *H. anthelmintica*. Given orally, this is the oldest of all remedies for leprosy and its use is attended with some improvement, even occasionally cure; at present trials are in hand of administering fresh units of *H. wightiana* orally. The active principle in the oil is gynocardic acid, a mixture of the lower melting-point fatty acids of the oil, and first separated by Moss in 1879, and at first used orally also.

Tournefort was the first to use chaulmoogra oil intramuscularly and reported apparent cures. Dr. V. G. Heiser used intramuscular injections of equal parts of chaulmoogra oil with camphorated oil and resorcin. As a result of his success, Sir Leonard had had sodium gynocardate prepared for him, and with the help of Rai Dr. Chuni Lal Bose Bahadur and Dr. Sudhamoy Ghosh in Calcutta had subsequently had prepared a whole series of derivatives. Eventually he concluded that the salts of the whole of the fatty acids of *H. wightiana* gave better results. After injections, excised nodules shewed lepra bacilli breaking down in myriads in the tissues, and steady clinical improvement was the rule with the patients. Intravenous use of the gynocardate then came to replace its intramuscular use and sodium morrhuate from cod-liver oil and sodium soyate from soya bean oil followed. With the gynocardate and similar treatments in patients treated for from 3 to 12 months, in 40 per cent. of patients the lesions had all cleared up, and in another 40 per cent. there was marked improvement.

The intravenous use of sodium hydnocarpate, however, was liable to have an irritant action on the vein, and accordingly the ethyl esters of the different fractions of the fatty acids of chaulmoogra oil were next introduced for intramuscular use; whilst Dr. Muir introduced "E.C.O.", consisting of equal parts of ethyl hydnocarpate, 4 per cent. double distilled creasote and pure olive oil. This is either given intramuscularly or the attempt is made to infiltrate the leprosy lesions with it by injection. In 13 leper asylums, to date, on 300 cases the results reported are 72 per cent. improved and 32 per cent. greatly improved in from 2 to 12 months of starting treatment; and 100 per cent. improved and 52 per cent. greatly improved in patients treated for from 6 to 12 months. In Hawaii, of 310 cases admitted 172 were discharged cured on parole, and it is hoped to have reduced the incidence of leprosy in the island by 45 per cent. within a decade. In fact the freeing of a given area or country from leprosy is becoming a practicable proposition.

Sir Arthur Newsholme contributed a note on the causes of the historical reduction of leprosy in

temperate climates, shewing how in Norway institutional segregation of lepers, following upon the introduction of compulsory notification of the disease, had reduced the incidence of the disease from 181 cases per 100,000 of the population in 1856 to 22 per 100,000 in 1905, since when it has become an increasingly rare disease.

Tuberculosis.—Sir James Kingston Fowler then read a remarkable and very interesting paper on tuberculosis in the tropics. Taking the analogous case of yellow fever on the West Coast of Africa, it practically never occurred among the negroes, but was confined to the immigrant and non-immune white; the former were immune, the latter not. The view was widely held that the increasing decline in tuberculosis in European countries was due to widespread mild infections in infancy which were recovered from, leading to the vast majority of the adult population being immune to the disease. "The future of tuberculosis prevention" writes one authority "lies in the deliberate exploitation of immunisation, by means of vaccinating doses of dead or attenuated bacilli." Mirauer recorded 88 per cent. of 145 non-tuberculous persons as having given a positive tuberculin reaction, but such a course is not devoid of danger. In phthisis, tuberculin is the worst of all "remedies" and a case of quiescent fibroid phthisis was cited in which an injection of tuberculin had been followed by the expectoration of four calcareous particles, invasion of another portion of lung tissue and fresh cavity formation; also of a man whose life had hung for 40 years on the integrity of a fibrous capsule around a caseous mass and who, when the capsule gave way, was dead in 28 days from acute miliary tuberculosis of the lungs. Some years ago, Sir John Rose Bradford had asked him what was the incidence of obsolete tuberculosis lesions in general postmortems. "In about 9 per cent." was the answer. "I thought you would say 90 per cent.," replied Sir John, "it is curious that that is the exact figure obtained from an analysis of 2,121 postmortems at Etaples," during the war on soldiers who had died from various causes or who had been killed. Martin's incidence figures at postmortems at the Middlessex Hospital from 1890 to 1891 gave the same figure, 9.4 per cent. On these findings where was the evidence that in European countries some 90 per cent. of the population acquired mild tuberculosis in infancy, to be followed by immunity in later life? There were some well-known old English families with magnificent constitutional physique; the men of which only began to feel old at 90, and died at about 96 years of age, apparently chiefly out of consideration for the claims of the rising generation. Local proverbial wisdom said that the only way to kill them was to poleaxe them. Was such a state of affairs due to acquired tuberculosis in infancy? He thought not. The diminution of recent years in tuberculosis was the result of other factors, better housing, better sanitation improved public hygiene.

On the other hand, when tuberculosis invaded virgin soil in non-immune Asiatics, it played havoc. At general postmortems on patients from the Asiatic labour corps in France during the war, there was no evidence of obsolete tubercular lesions,—quite the contrary. But the incidence and death rate among them from phthisis were awful. The following figures shewed a most striking contrast:—

| | Annual case incidence per 10,000 strength. | Annual deaths per 100,000 strength. |
|--------------------------|---|--|
| S. African Labour Corps | .. 186 | 167 |
| Cape Colony Labour Corps | .. 444 | 88 |
| Indian Labour Corps | .. 142 | 53 |
| Chinese Labour Corps | .. 36 | 12 |
| British Army in France | .. 10 | 0.5 |

He did not consider that the best way of creating an A1 population was to vaccinate them all with dead or attenuated tubercle bacilli. Passing on to measures to be taken to deal with tuberculosis in the tropics, the

value of compulsory notification was a moot-point; it was of no value when the patient was almost dead. He knew of no specific remedy of any value. Hospitalisation often made a mild case worse. What were wanted were not hospitals, but tuberculosis settlements, a scheme for which he outlined, where, together with the necessary sanatorium and hospital departments, you would also have industrial departments, open air cottages and hostels, workshops, and training in handicrafts; in other words a colony. The tuberculosis problem is, to a very large extent, a housing problem all over the world. "Any country that rejects compulsory vaccination and retains its slums must pay for small-pox hospitals and tuberculosis settlements."

In opening the discussion, Dr. H. C. Clark said that whereas the course of tuberculosis was usually measured in years in the case of white races, it was a question of months in the coloured races. Hardly a single case among the latter shewed evidence of healed tubercular lesions at postmortem examination, and miliary tuberculosis of the lungs usually set in early and soon carried off the patient. Dr. W. M. James assessed the case mortality of phthisis among the coloured population in the Panama Canal zone at 100 per cent. He was sorry to hear Sir James Fowler speak as badly of immunisation, because there was at present so very little that one could do for these unfortunate victims. Dr. R. C. Connor related the history of a medical officer of health in Panama who was an enthusiast about tuberculosis, and who tackled the slum question in earnest. His work progressed rapidly until he came to tackle the wealthier quarters of the city; then he was transferred elsewhere and his successor dropped the programme. Sir Thomas Oliver was surprised at Sir Kingston Fowler's postmortem figures; knowing the distinguished position which the latter held as a pathologist they must be accepted as reliable; but at Newcastle the pathologists informed him that the incidence of tubercular lesions at all postmortems was in 75 per cent. of bodies, whilst at the Morgue in Paris it was 90 per cent. Tuberculin could not be entirely discarded; but it must only be used for very carefully selected cases. Dr. W. E. Deeks remarked that he always sent white patients who contracted tuberculosis in the Canal zone to a high dry climate such as that of New Mexico. In 15 years he had only known of one death amongst them.

Influenza.—Sir Thomas Oliver introduced the subject of influenzal pneumonia. The most striking feature of epidemic influenza was the tendency which it showed to vary from time to time in type and in its severity; one epidemic might be of gastro-intestinal type with low mortality; another of broncho-pneumonic type with high mortality. The death rates in France from influenza during the great war were tremendous; in 1918 the French army lost 9.38 per mille of its soldiers from it. In the severe types what was present was not lobar pneumonia so much as broncho-pneumonia, often with a minimum of recognisable signs, but with profound toxæmia and necrosis of the mucous and submucous layers of the bronchioles. The disease was also important in awakening to activity old and latent tuberculosis.

Dr. M. J. Rosenau said that at the outbreak of the great pandemic they all thought that Pfeiffer's bacillus was the cause of influenza. They collected 99 healthy volunteers from the Navy and with some trepidation started painting their throats with pure culture of this organism, giving it in sprays to them to inhale, and nothing happened. Collected mucus from the nose and throats of influenzal patients also proved to be innocuous. It also failed to produce the disease when injected subcutaneously. Apparently the virus was so delicate that it died very rapidly after leaving the body. Next, arrangements were made for each volunteer to sit close up, face to face, with an influenzal patient and to breathe in his expired air. None of them contracted influenza, although some of them contracted a septic sore throat. He did not want to infer that the virus

was not present in these secretions, but there were factors underlying its spread which we did not understand. Dr. W. H. Park spoke of the rôle of traffic in spreading the infection. As to the micro-organisms concerned, everything depended on the bacteriologist; one man would always find Pfeiffer's bacillus, another always streptococci, "change the bacteriologist and you change the bacteriological findings." He considered Pfeiffer's bacillus merely as a secondary invader. Dr. Hoffman drew attention to the 66 weeks' cycle of influenza epidemics as a phenomenon which required explanation. Sir Arthur Newsholme pointed out that in the 1890-91 epidemic the disease chiefly affected old people; whereas in 1918 its chief incidence was in young adults. Dr. Scale Harris said that America blamed Europe for her influenza epidemics, whilst Europe blamed America for hers. The 1890-91 epidemic was said to be "Russian flu," that of 1918 "Spanish flu." New York was the chief distributing station for the Southern States. MacCallum had found that if two cages of rats were placed side by side under similar conditions of exposure to lung infections, but given different quantities of vitamine A, the ones with deficiency in vitamine contracted the diseases, the others did not. Dr. W. E. Deeks spoke of mercurochrome intravenously as having given brilliant results in post-influenzal pneumonia, also in gonorrhœal rheumatism. The drug is administered in a 1 per cent. solution, and 1 c.c. given for each 10 lbs. of body weight. There is usually a more or less severe reaction, with fever rising to 106°F. or so, but thereafter as a rule rapid resolution.

Pneumonia.—Dr. W. H. Park then discussed the value of antisera in pneumonia. Pneumonia was probably responsible for more deaths in the world than any other disease. In 1923 among the employees of the United Fruit Co., the death rates per mille were from pneumonia 5.5, from tuberculosis 2.2, from dysentery 1.9, and from malaria 1. The pneumococci are divisible into a number of types, and vaccination of an animal with one type causes it to produce an antiserum for that type, but for no other type—at least as far as therapeutic efficacy goes. Intravenous injections of the antibody so produced in a case of pneumonia will prevent invasion of the blood by the type concerned and matching the serum, and, with few exceptions, will sterilise the blood which has been invaded. As it is chiefly the septicæmic cases which die, such serum should be of value in treatment. Cases of pneumonia due to type 1 treated with type 1 serum showed a marked reduction in mortality; a death rate of 9 per cent. as against one of about 20 per cent. for untreated cases. Felton in 1924 had discovered a method of refining and concentrating the serum by precipitation of its globulins with distilled water, collecting the precipitate, and re-dissolving it in maximal concentration; the concentration being some ten times the original in potency. Sometimes a chill followed the intravenous administration, but different preparations varied in this respect.

In treating a case, if possible, the strain of pneumococcus concerned should be typed. A first dose of 5 to 10 c.c. of the polyvalent antibody for types 1, 2, 3 and any other dominant strain could then be given. The pneumococci causing pneumonia should be studied in each region, so that there would be available the type antibodies needed for the cases concerned. (In India, as our readers know, this investigation is now being carried out by the Army authorities, also by Capt. Malone at Parel and by Colonel Cunningham at Madras.) Up to the present, type 1 cases seem to respond better to type 1 serum than do type 2 and 3 cases to their corresponding sera, whilst type 2 cases correspond better to their sera than do type 3 cases. Felton's work, however, renders the high concentration of antisera possible and better results may be looked for. The potency of each phial should be marked on it, and for this purpose it was desirable to introduce some standard world unit in which to express potency.

Dr. Rosenau gave an account of Felton's work. Dr. Nichols stated that the use of type 1 serum in a type 1 epidemic had reduced the mortality from 30 per cent. to 7 per cent., and the number of funerals shewed an inverse relationship to the available supplies of the serum. In the U. S. Army they had tried anti-catarthral vaccines and vaccines of *B. pneumosintes*, the supposed cause of epidemic influenza; and when influenza came along it was those vaccinated that it picked out first. They had also tried oral vaccines in the natural paratyphoid B infection of guinea-pigs and they gave no protection. If another great influenza epidemic were to come along to-morrow, we should not be much better off than in 1918; only this time we should keep all the patients strictly in bed and make considerable use of the sera of convalescent persons. Major Dunham spoke of the extensive use in the American Army of a mixed vaccine of types 1, 2, 3 pneumococcus, Pfeiffer's bacillus and streptococcus; 6,000 soldiers were given the vaccine and some 14,000 were unvaccinated controls; the results were negative. Dr. W. H. Park, however, reported good results in using vaccines against lobar pneumonia. The vaccine consisted of 2,000 million each of types 1, 2, 3 pneumococci, 2,000 million streptococci, and 1,000 million influenza bacilli per dose, and 3 doses each were given to 1,536 employees of the Metropolitan Life Insurance Society; whilst 3,025 uninoculated people acted as controls. Two cases of pneumonia occurred during the next three months among the uninoculated, none among the inoculated. At an asylum for insanes, 3,000 patients were taken and half of them inoculated, the rest acting as controls. During the next year there were 6 cases of pneumonia in the controls as against 3 in the inoculated. The author concludes that a short duration immunity is apparently conferred.

Bronchitis.—Dr. Castellani then gave an account of the causes of hæmorrhagic bronchitis of non-tubercular origin, instancing no less than 18 causative micro-organisms as responsible for such conditions. In bronchial spirochaetosis, the diagnosis is established by examining the sputum collected after a preliminary rinsing of the mouth; it is found to be swarming with spirochaetes. For the acute cases aspirin and codeine are useful; for sub-acute and chronic cases tartar emetic orally, arsenical preparations, and potassium iodide occasionally. Bronchial amoebiasis (without accompanying liver abscess) has recently been described by several authors. Broncho-mycosis may be due to one or other of a large number of these fungi, the chief genera concerned being *Nocardia*, *Monilia*, *Aspergillus* and *Sporotrichum*. Potassium iodide in large doses plus autogenous vaccines appear to be the best lines of treatment. Experimentally, in animals given intravenously or intraperitoneally to rabbits and guinea-pigs. Other strains proved non-virulent, whilst with some others, on intravenous or intra-pulmonary injection, a peculiar nodular condition of the lungs was produced. Cultural investigation of the sputum was called for in all cases, with sugar tests to determine the species present. "Tea-factory cough" is probably an instance of pulmonary moniliasis, due to the inhalation of spores of the fungus when inhaling tea dust. A very complete account is given in the paper of all the species concerned, fully illustrated by plates shewing their morphology and cultural characteristics, whilst the paper ends with a very useful bibliography. Dr. F. M. Johns said that far too much reliance was placed by physicians on the x-ray diagnosis of phthisis; cases shewing hazy shadows might be cases of broncho-moniliasis. Dr. Iturbe recorded having found *Paramonimus westermanni* in the lungs of dogs; the intermediary hosts are a snail, *Ampullaria limostoma*, and a crab, *Pseudotellphusa thurbei*, and an account of the life history of the parasite was given. Colonel Ashford related the history of a patient intestinally infected with *Monilia psilosis*, who had suddenly developed an abscess of the lung due to this organism,—the case finally clearing up on an autogenous vaccine of this organism.

Dr. A. A. Facio said that in some instances of supposed bronchial spirochaetosis, great improvement had taken place after injections of nicosalvarsan, yet the sputum still shewed the same spirochaetes as before, in some instances for as long as 2 months after completing treatment. Dr. H. C. Clark considered that many cases of mycotic disease of different organs were overlooked or misdiagnosed; our knowledge of the subject was still rudimentary.

Measles.—Dr. W. H. Park read a paper on the use of convalescent plasma in cases of measles. The observations recorded were made in New York over a period of three years. Blood from 60 adults who had recently recovered from attacks of measles and who were Wassermann-negative were collected, and the whole plasma used. Over 1,500 children received preventive injections of 3 to 10 c.c. on exposure to infection; during a period of six months accurate records were obtained in connection with 979; 84 per cent. escaped the disease as against 52 per cent. of others in the same families not so treated. The dose should be 6 c.c. for a child under 3 years of age who has been exposed to infection and 10 c.c. for a child over that age. Immunity is given for one month, and in order to obtain the most potent serum the convalescent should be bled very shortly after convalescence.

Pathology.—Dr. F. B. Mallory pleaded for the encouragement of pathological work in the tropics. The physician's mistakes are often brought to light only in the postmortem room, and instances were quoted of miliary tuberculosis mistaken for chronic myocarditis; of a lesion of the hand due to chronic yaws mistaken for carcinoma. The accumulation of material and observations will help in very many still unsolved problems. Dr. R. P. Strong contributed a valuable paper on the development of pathogenicity and parasitism. If we are to take long views, we must regard parasites as being just as much subject to evolution as their hosts; and it is probably true to-day that, as in the past, so now many free living or saprophytic living forms are acquiring the habit of parasitism. Among the nematodes a number of examples occur; thus *Strongyloides* shews an adaptation to both free living and parasitic generations. In the case of *Aphelenchus*, a small nematode which causes "red ring" disease in cocoa-nut palms, free living forms have acquired parasitic properties towards plants. The spirochaete of Vincent is usually non-pathogenic, but under conditions of local lower resistance becomes pathogenic. The free living spirochaetes of stagnant water and filter beds had until recently been regarded as non-pathogenic; now Zuelzer and others have shewn that among such spirochaetes were leptospirae, morphologically identical with *L. icterohaemorrhagiae* and capable of causing symptoms resembling those of Weil's disease on injection into guinea-pigs, after long cultivation in media containing serum. Rickettsiae were in some instances pathogenic, in others not; this group of organisms appeared to be natural parasites of insects, which are now in course of evolution in some instances into pathogenic parasites of vertebrates. The apparently natural flagellate forms in the mid-gut of certain *Triatomas* in South America, when injected into laboratory animals developed into the trypanosome of South American trypanosomiasis. The *Herpetomonas* of *Euphorbia* were normally not pathogenic to laboratory animals. But what are apparently these same herpetomonads are also found in the Hemiptera feeding on infected plants and in lizards on such plants which feed on the Hemiptera, and the flagellates from the lizards in some instances proved pathogenic to monkeys. It would appear as if the flagellate, in transit from plant through insect and lizard had acquired properties of virulence.

Records.—Sir Arthur Newsholme next read a paper on the bearing of disease records in public health work. Theoretically it ought to be possible to eradicate a disease, such as malaria, by the right hygienic measures without knowing anything about its incidence and distribution; actually such knowledge was the corner-stone

on which efforts for the prevention of disease were based. In the old days it gradually became recognised that bad conservancy meant epidemic intestinal diseases; with improved conservancy in England cholera dwindled and the enteric incidence fell. Then came the knowledge of the carriage of such diseases by water-supplies, milk supplies and through oysters and fish, and finally the discovery of the carrier state; each discovery being followed in turn by the application of fresh precautionary measures with an ever lessening incidence of the disease. Typhus had disappeared from Great Britain long ago, but had its transmission by the louse been known, it could have been eradicated far more rapidly. In a manner the sufferings of the sick are the vicarious means of reducing and abolishing the sufferings of others. In the presence of a big epidemic, fear is the most notable stimulus towards an improvement of public health. With regard to the notifiable diseases each case should be regarded as the potential starting-point of an epidemic and should call for protective measures; and field work becomes the most essential element in the practice of preventive medicine. The laboratory is a valuable auxiliary, but the clinician and the public health official also come in; no source of information should be neglected, and co-ordination should be the order of the day; a mere ideal plan drafted in an office was useless.

Sir Thomas Oliver drew attention to the use by anti-vaccinationists of the decline of tuberculosis before the discovery of the tubercle bacillus, and of the eradication of typhus in Great Britain long before the discovery of the louse transmission of the disease in their campaign against vaccination. Major Dunham said that it was impossible to practise preventive medicine from an office desk. In the American Army they made their bacteriologists serve on the clinical side. Sir Leonard Rogers spoke of conditions in India, where records were available for the British and Indian armies, and for jails, which could be relied upon, for the past 50 years. The figures for the general civilian population were far less reliable. Dr. H. R. Carter pointed out that in a number of cities in South America fairly accurate statistics as to causes of death had been kept right away from the 17th century in the Spanish archives of the mortuaries, the "*libros des defunciones*." Those ancient scholar priests did their work well; for instance he had come across accurate records of 1,014 deaths having taken place in one day in the little town of Forteleza in Brazil from the combined effects of epidemic small-pox, drought and starvation.

Publications.—Dr. H. J. Nichols then read a paper on the needs of publication in tropical medicine; (a paper which has given us much food for reflection and which we wish that we could reprint almost verbatim). Practically speaking the science of tropical medicine is to-day about 30 years old. The output is enormous and is rapidly increasing, but "scientific records are apt to be the last to be established and the first to feel the cut of economy," (as readers of the *Indian Journal of Medical Research* know only too well, as the result of the misapplied zeal of the Inchcape Retrenchment Commission). What is called for is *thoroughness*. First on the part of the individual contributor; he must so prune, trim, and polish his manuscript that it shall be a model essay, concise, clear and brief; there is no room for egotism in medical journals, there is no space for the reproduction of a 'cinema film' of the laboratory work, and it is unnecessary to review the literature on the subject "back to the year one." Given important reports on medical research work in tropical medicine, however, where is the author going to find publicity? He may be fortunate enough to find acceptance in such general and splendid journals as the *Lancet* or the *British Medical Journal*, but the editor of a general journal cannot be expected to give much space to exotic subjects. Then come the special medical research journals; admirably run—most of them—(especially our new contemporary, the *American Journal of Tropical Medicine*, if we may be permitted the remark)

but costly and hardly a business proposition. Reports of organisations, such as the present volume under review, are a third source of publicity, but of limited general circulation. Government reports are avenues for publication where anything of value tends to be buried under a husk of routine matter and ultimately pigeon-holed. (The pioneer work of D. D. Cunningham and Lewis in India on the entamoebæ, cholera, trypanosomiasis and several other subjects is a good illustration; it is to-day buried and almost inaccessible in the annual reports of the Sanitary Commissioner to the Government of India for the years 1870-1880.) Proceedings of learned societies are another source of publicity and often a valuable one, as in the *Proceedings of the Royal Society of Tropical Medicine and Hygiene*. Finally, this enormous output, published in some dozens of different journals, etc., all over the world requires digesting for the ordinary reader. Here, luckily, there are the altogether admirable *Tropical Diseases' Bulletin* and the *Bulletin de l'Institut Pasteur*, one or both of which are absolutely essential to all serious students of tropical medicine. Philanthropists to-day endow institutions and schools of tropical medicine; the need for the endowment of journals of tropical medicine has not yet been recognised, but is a most pressing one. (The volume under review is an admirable example of how to do it.)

(If we may be permitted comment on Dr. Nichol's paper, it is to say that a medical journal in the tropics requires the collaboration of a capable editorial staff with business ability, and, as both are unlikely to be met with in the same individual or individuals, different individuals should represent both interests. If one can further secure a good status of publisher, so much the better. It is the advertisements which pay for the cost of publication of a journal, and no proprietor of a medical journal can afford to let this side of the matter drop. On the other hand, it is the status of the journal and its circulation that attract the advertisers, and this depends upon the quality of its literary matter. It would be ideal to get some broad-minded philanthropist to subsidise a medical research journal; it is more stimulating to face the struggle for survival.)

In the discussion which followed Dr. Nichols' paper, it became clear that two types of journal are wanted; the first the journal for the general practitioner, which shall be elementary but shall review as wide a field as possible; the second the journal for the research worker and specialist, which is bound to have but a limited circulation and will probably not pay. An interesting suggestion thrown out was that the successful journal of the first type should run or subsidise journals of the second type. Finally, speakers appeared to be unanimous on one point; where a contributor of a long or important paper sends it in, he should also send in with it a brief summary suitable for abstract or republication in more general journals.

The Gorgas Institute.—Dr. E. Zubieta then gave an account of the proposed Gorgas Institute of Tropical Medicine, to be established at Panama in memory of the splendid work of Major-General Gorgas during the construction of the Panama Canal. We confess that Dr. Zubieta's account makes our mouth water. There is to be a hospital of 750 beds, costing 3 million dollars, which was to have been opened last September. Six million dollars are to be spent upon the associated institute of tropical medicine. This is "some" scheme, though in no way more than adequate for the needs concerned. But in parsimonious India we think in terms one-tenth or one-twentieth of those which the enterprising business and medical organisations of Central America consider normal. The functions of the institute are to be three-fold; it will be primarily a research laboratory in tropical medicine and hygiene; secondly it will be a school for post-graduate instruction; thirdly it will serve as a centre for the preparation and distribution of scientific and medical literature to workers throughout the tropics. Lastly, it will be a fitting memorial to the immortal work of Gorgas in

the Canal zone. During the French attempts at construction of the canal in 1870 to 1880, no less than 22,189 labourers died of disease, chiefly from malaria, dysentery and yellow fever, and the death rate was about 65 per mille per annum. Gorgas and his colleagues abolished yellow fever from the area; they reduced the malarial incidence to such a pitch that there were only 12 admissions for this disease in the last month for which figures are available—June, 1924; whilst the dysentery incidence has been reduced to about one-eighth of what it was. From the account which Dr. Zubieta gave of it, however, the Gorgas Memorial Institute will be no unworthy memorial to that great pioneer.

Military Medicine.—Major Dunham then gave an account of the work and organisation of the medical department of the U. S. A. Army in the tropics. Of a total strength of 134,808 officers and men of this army, 32,297 are stationed in tropical and subtropical regions. When Porto Rico was occupied after the war with Spain, it was found that the civilian population was ravaged with a disease known as "tropical anæmia"; the work of Colonel Ashford and others shewed that this was ankylostomiasis, and the island was now not merely healthy but exceedingly flourishing. In the Philippine Islands a board for the investigation of tropical diseases was instituted in 1900 and functioned till 1915; it was under the ægis of this board that Strong made his study of bacillary dysentery in Manila, that Craig and Ashburn demonstrated the rôle of *Stegomyia* in transmitting dengue, that Vedder carried out his work on beriberi and amebic dysentery; whilst in 1922 there was created the U. S. A. Army Medical Department Research Board to carry forward the same duties. Studies in metabolism in the tropics, the incidence of intestinal parasitic infections and the epidemiology of dengue at present occupy their attention. Malaria is a problem requiring ever constant attention in the Panama Canal zone. Dengue is a disease which causes much sickness and is especially spread in the Southern States by automobile travellers; in 1923 it accounted for an admission rate of 79 per mille of American soldiers in the Philippines. The men of the army usually remain for but a short time in the tropics, the term of tropical service being 3 years in Panama and 2 years in the Philippines; and extended observations are now in progress to determine the effect of residence in a tropical climate upon their mental and physical efficiency.

General.—Dr. J. Azurdia next invited the members of the conference to visit Guatemala and commented on the difficulties of introducing efficient sanitation into the Central American States where the population consisted of Spaniards, Europeans, Negroes, Mestizos and the offsprings of these different races intermixed in different degrees, but most of them animated by the policy of "mañana" (to-morrow, not to-day). The original Maya race in Central America had a high development of civilization, but there was but little trace of it to-day. Something of their skill with indigenous drugs must have been handed down through the generations, but from fear of the Spanish conquerors most of it had been concealed and lost. To-day which all races contributed during the great war, humanity is earnestly seeking a solution to prevent such catastrophes in future, and striving energetically to be uninterrupted productive work, wealth and capital unless healthy conditions are produced, and preventive medicine is the basis for all future progress in the tropics.

Drs. H. C. Clark and J. Zetek read a paper on tick biting experiments in bovine and cervine piroplasmiasis. The ticks *Margaropus annulatus* and *Amblyomma cayenense* are both found attached to cattle and deer in Panama. Experiments were carried out with the first. White-tailed deer shot in the locality shewed scanty Piroplasma infection. In one instance the

progeny of ticks removed from a sick deer proved capable of producing a mild attack of piroplasmiasis in a half-breed non-immune calf. Probably bovine and cervine piroplasmiasis in the district are identical, or else the tick in question is a carrier for two types of piroplasmiasis. The deer may, in fact, act as a reservoir for cattle piroplasmiasis in Panama. Dr. J. Iturbe also contributed a paper on the treatment of "derrengadera," a disease of cattle and horses due to *Trypanosoma venezuelense*, with "Bayer 205." There are two types of equine trypanosomiasis in Venezuela; "pesta boba," an acute disease with high fever and acute anæmia, terminating fatally in 80 per cent. of cases in from 15 to 60 days, and "derrengadera," characterised by the slow onset of paralytic symptoms, and with a 100 per cent. mortality. The disease differs from mal-de-caderas, due to *T. equinum*, in the absence of hæmoglobinuria, whilst the two trypanosomes are morphologically different. In the guinea-pig the trypanosome causes death from generalised œdema and hæmorrhage in 15 to 22 days; in a horse experimentally inoculated death supervened in about two months. The transmitting host is probably *Tabanus importunus*. Bayer 205 has proved an invaluable agent in the cure of the disease.

Finally Mr. W. H. Pickering read a paper on "What we know about Hurricanes," and Dr. W. E. Deeks one on the development of the medical department of the United Fruit Company.

* * * * *

We have devoted considerable space to a review of this wonderful and comprehensive work, but we trust that we have done so in the interests of our readers. We consider that since the publication of Byam and Archibald's "Practice of Medicine in the Tropics" there has been no other publication of equal importance to the present volume, which forms an admirable supplement and sequel to that larger work. We regret that no official delegate from India was present at the conference,—with the exception of Sir Leonard Rogers, who attended unofficially. The problems of tropical medicine are world-wide and international. That they are being very seriously considered and dealt with in Central America and the West Indies is evident; it appears to be India's role to make the discoveries and then to let the opportunities for applying them slide.

R. K.

Current Topics.

Malarial Survey of the Mining Settlements of Singhbhum.

REPORT NO. 11.

By R. C. WATTS, M.D., D.P.H., D.T.M.

CAPTAIN, I.M.S.,

From:—The Superintendent, Government Printing,
Bihar and Orissa, Patna.

THIS well-drafted and fully illustrated report is in continuation of the earlier preliminary report by Colonel Christophers, noticed in our issue for March 1924, and is interesting as shewing the different anti-malarial measures which may have to be adopted in different stations within the same district. In general Singhbhum is a tract of some 4,000 square miles, one quarter of which is covered by jungle. Taken as a whole it is a hilly upland tract containing hills alternating with valleys, steep jungle-clad mountains, and in the river-basins stretches of comparatively level or undulating country. On the whole the climate is hot and dry, though some 50 to 60 inches of rain fall during the monsoon period. The indigenous population are

aboriginies, and most of the labour for the mines has to be imported from Bengal or Madras. In order to irrigate their fields the local inhabitants do not use the large rivers or streams to any extent, but rely on "bunds," constructed to dam up nullah beds and thus create small reservoirs for drinking, bathing and irrigation. This damming of small streams leads to the presence of surface springs especially by the sides of rice fields, which become noteworthy and notorious sites for mosquito breeding. The country is one where malaria is hyper-endemic, and constitutes the most serious problem facing the mining industry.

Part I of the report deals with the mining settlements of the Bengal Iron Co. at Manoharpur, Duia and Chiria. At Manoharpur malaria is prevalent the whole year round, and in 1923 accounted for 2,205 out of 4,617 admissions to hospital. Here the mining settlement is situated on level ground cut up by the beds of various streams and rivulets. At Duia the camp is situated in a small valley, divided into two halves by a hilly ridge and surrounded on all sides by steep forest-clad hills, and the water-supply is from wells and the Duia stream. At Chiria the camp is situated at the foot of Buda hill and follows the river Hamsada. The total labour strength at the three camps is about 1,500. The chief anophelines present are *A. culicifacies*, *A. listoni*, *A. fuliginosus*, *A. rossi*, *A. willmori*, *A. jeyaporensis*, *A. fowleri*, and *A. sinensis* (a fairly formidable but not complete list). The first is the most important carrier in the district, however. At Manoharpur the chief breeding sites were found to be the pools in the beds of three ravines, rice fields and the pools of subsoil water close to them, and pools in the bed of a large excavation made for the railway. At Duia the chief sites were pools in the bed of the main stream, also in the hospital nullah, but no larvæ were discovered in the wells. In footmarks, hoofmarks and spill water pools beside a spring half a mile from the Company's railway station, also anopheles larvæ were found swarming throughout the year. In Chiria the breeding places are extensive and numerous; the stony bed of the Hamsada stream, its tributary nullahs, swampy areas near the railway line, seepage water at the foot of Buda hill, and a cement masonry tank on the top of the hill all provide sites. The spleen rates at the three camps during the malarial season were 81 per cent., 57 per cent. and 67 per cent. On the other hand, Chiria shewed the highest endemic index and also the highest average number of parasites per c.mm. of blood, 1,485 as against 560 at Manoharpur.

Turning to anti-malarial measures, it is obviously impossible to eradicate malaria in the three camps; all that can be done is to try and keep it under control. Nor is it practicable to remove the sites of the camps. At Manoharpur the measures proposed are subsoil drainage for the Manoharpur ravine, purchase of one special rice field which is a pestilential source of anophelines and its drainage, and to either canalise or fill up the large excavation made by the railway. At Duia subsoil drainage for the hospital nullah is necessary. At both camps Capt. Watts suggests the best sites for future extensions and new bungalows and lines. At Chiria the present site cannot be effectively dealt with. Here the camp should be moved, either to the top of Buda hill, 2,700 feet, or to high, dry ground to the north-west of the present lines, when it could be supplied with a piped water-supply from the top of the hill. Turning to general measures, the present bungalows are not suitably constructed for screening, but a mosquito room, 10 ft. × 8 ft. × 8 ft. should be used in the evenings. An experiment at the foot of Buda hill shewed that subsoil drainage was the most practical way of dealing with rice fields and subsoil springs, whilst it proved practicable to oil wells without those using them having detected it. Local species of fish were found to be of no use as feeders on larvæ. Prophylactic quinine is suggestive as an additional measure. Finally, propaganda and education are essential.

Part II of the report deals with the Cape Copper Co.'s mines at Rakha, the North Anantapur gold mines at Chapri and Kandadih, and the Cordova Copper Co.'s mine at Mosaboni. At Rakha malaria is responsible for some 28 per cent. of the total sickness; the spleen rate was 44 per cent., and parasite infections up to 46,816 per c.mm. of blood were encountered, with an endemic index of 52.5 per cent. Again *A. culicifacies* was found to be the most important local carrier. The chief breeding sites were found to the Gurra river above its junction with the Kusumbagan stream and a *kutchra* tank and paddy fields in the centre of the camp. It is recommended that the tank should be abolished, and the paddy field purchased and drained; that the discharge from the main shaft, containing copper sulphate solution, should be discharged into the Gurra river further upstream in order to kill the larvæ, and that the areas surrounding wells should be dealt with. The mine agent's bungalow is too near the village and should not be occupied for residential purposes; but if it is not possible to leave it, it should be screened. At Chapri and Kandadih, two villages a mile apart, there were 638 admissions for malaria out of a total labour force of 1,441 between August and October, 1923. The spleen rates were 64 per cent. and 34 per cent. respectively, and the endemic indices 43 per cent. and 36 per cent. *A. culicifacies* here again was the most important local carrier. Both camps are too near the local villages and should be moved. At Kandadih suitable high, dry land is available, and as both camps are still temporary their removal to better sites is indicated. At Mosaboni about 100 out of the 735 coolies go sick with malaria monthly and the spleen index was 33 per cent. Here the predominant mosquito was *A. rossi* and not *A. culicifacies*, the latter being found only in two nullahs and in Mosaboni tank. This area requires re-survey during the malarial season.

In Part III, Capt. Watts deals with certain clinical observations made during the survey. Of 242 control adults examined, the average hæmoglobin percentage was 80. Among children at Manoharpur, Duia and Chiria the index in November 1923 was 75 per cent. in children 1 to 5 years of age, 76 per cent. in children 6 to 10 years of age, and 80 per cent. in children 11 to 15 years of age; for April 1924, during the non-malarial season the corresponding figures were 93, 97 and 98 per cent. Amongst immigrant children at Rakha 33 per cent. became infected within the first year of residence at ages 0 to 5 years, and it is interesting to note that the average splenic enlargement was more than double that among the aboriginal children of the locality. Conditions among adult immigrants entering the area are very bad; of the labour force constructing the Anda-Jamda railway the engineer in charge estimated the loss of efficiency from malaria to be 50 per cent., and every man discharged had to be given three months' leave to recuperate his health. At one mine 300 Madras labourers were imported; within a fortnight 10 of them had died of cerebral malaria and the rest had to leave the area owing to being constantly fever-stricken. The spleen rate amongst adult immigrants is double that for the aboriginal population and the average number of parasites per c.mm. about four times that for the local population. The majority of parasites encountered resembled the "*Plasmodium tenue*" of Stephens.

In summarising the measures necessary, Capt. Watts comments on the necessity for such commercial undertakings to consult expert medical opinion as to selection of camp sites; if this is not done, sites near nullahs which are pestilential mosquito breeding grounds may be selected; the coolie will live near water if he can, whereas the high, dry ground is better, and jungle should be cleared for at least 200 yards around the camp site. Wet rice cultivation is the second danger and no buildings should be constructed within quarter of a mile of such fields. Susceptible persons should be housed in quarters some distance away from the local villagers, whilst if prophylactic quinine is issued it should be given

under supervision, 10 grains on two consecutive days a week. Finally, he lays down the duties and uses of mosquito brigades, which should be under a supervisor of the Maharaj class, whom the coolies will respect owing to his caste.

"The British Journal of Venereal Diseases."*

THE study of venereal diseases has passed through various stages; in the remote past the subject was often regarded as somewhat taboo; to-day it is discussed, even by laymen, with a frankness which would have horrified our grandmothers; it even forms the plot of such popular novels as "*The Green Hat*." From the medical point of view syphilis has been classed first with urology, then with dermatology; whereas in reality it forms a very important part of all general medicine. With the introduction of salvarsan and its derivatives, of the Wassermann test, and of self-disinfection, the whole attitude of the medical profession towards venereal diseases has altered; and the subject is one of enormous importance. The appearance therefore of *The British Journal of Venereal Diseases*, a new quarterly publication, is fully justified. It is intended to deal in each issue with two of the following subjects, reviewing the recent literature:—syphilis, gonorrhœa, the pathology and biochemistry of venereal diseases, neurology in relation to venereal diseases, dermatology in relation to venereal diseases, pediatrics and gynecology in the same relationship, urology and sociology in the same relationship. Thus the journal will have a very wide field of interest and should appeal to several different classes of medical men.

In the first number Colonel L. W. Harrison deals with the public health organisation in England and Wales to combat venereal diseases. Here the main lines of policy followed since 1918 have been the setting up of gratuitous treatment centres, the extensive provision of facilities for free laboratory examinations and tests, free supply of arsenobenzol compounds, and the education of the public. The total attendance at these centres in England and Wales in 1923 was no less than 1,605,617; and Colonel Harrison concludes that there has been a real decline in the incidence of syphilis in the general population. With regard to gonorrhœa, however, matters are more difficult. This is largely due to the lightness with which the public regards this disease; but it is also largely due to its indifferent treatment by medical men. In reality to-day gonorrhœa is more difficult to diagnose and treat properly than is syphilis, whilst its incidence is at least from 2½ to 3 times that of syphilis. The chronic gonococcus carrier is one of the gravest menaces to public health; and in Colonel Harrison's opinion this is a matter where full and adequate hospital facilities to ensure complete and absolute sterilisation of the infection should be provided, since it is very difficult for the ordinary medical practitioner to carry out treatment to this stage. Further, incessant education of the public is very necessary.

Drs. E. P. Cumberbatch and C. A. Robinson deal with the use of diathermy in gonococcal infection. The gonococcus is exceedingly susceptible to heat whilst a temperature of 114°F. can be reached in the cervix uteri by a diathermy apparatus; also in addition to its direct action on the gonococcus diathermy assists phagocytosis and increases tissue resistance. In the female these authors first apply diathermy to the urethra; a bougie electrode is inserted, and the circuit completed by a belt electrode of sheet lead secured around the pelvis. The current is gradually increased until the sensation of heat gives way to that of pain; it is then decreased until there is no pain and is kept at this strength for ten minutes. The cervix is next treated; here the cervix is insensitive, but the previous application to the urethra will have determined the current

* *The British Journal of Venereal Diseases*. Published by the Oxford University Press and Messrs. Constable and Co., London; and P. O. Box No. 31, Bombay. Price 20s. annually; 6s. per number.

necessary to produce a temperature of 114°F., and this is applied for ten minutes. Where a vaginal speculum cannot be applied, as in children suffering from gonococcal urethritis, diathermy can still be applied by the rectal route.

Dr. W. J. Tulloch writes on the complement-fixation reaction in gonorrhoea. Here it is essential first that the antigen used must be devoid of anti-complementary qualities, since the humoral response in the disease is slight; secondly, to use a strain which has been proved by absorption of agglutinins to belong to the predominant type. The technique is described in full detail and the author comes to the following conclusions:—(1) That sera giving a positive Wassermann reaction do not give false positive reactions in the gonococcus fixation test, the figures shewing a maximum probable error of only 2.6 per cent. (2) That the test appears to give markedly specific results; in 30 out of 561 cases, a positive fixation test was followed by negative microscopical findings; but all 30 cases were females and the presumption of gonorrhoea was strong in all; the error in any case does not exceed 6 per cent. (3) That the test is one of considerable delicacy.

Dr. F. T. Burke reviews the present position of bismuth therapy in syphilis. He places the relative values of the "anti-syphilitic triad" as follows:—arsenic, 10; bismuth, 8; mercury 3. Bismostab, which consists of finely divided metallic bismuth suspended in a 5 per cent. glucose solution, is advocated and deep injection into the gluteus. The following is his routine treatment for a case of syphilis seen in the early primary state:—

| | |
|-----------------------------------|----------|
| Stabilarsan once weekly for . . . | 8 weeks |
| Bismostab thrice weekly for . . . | 4 weeks |
| Stabilarsan once weekly for . . . | 8 weeks |
| Bismostab thrice weekly for . . . | 4 weeks, |

being a total course of 24 weeks. He summarises the present position with regard to bismuth as follows:—

"Bismuth is a most valuable and powerful drug in the therapy of syphilis, in all stages of the disease. It falls very little short of arsenobenzol in its effect upon the superficial and visceral manifestations, and upon the serological reactions of the blood and cerebro-spinal fluid. Unlike arsenic, its use does not expose the patient to any serious risk; no fatality from its use has been recorded. Having a tremendously higher therapeutic value than mercury, the amount of treatment now required is correspondingly decreased. With bismuth, modern and rapid treatment can be administered to the arsenic-intolerant patient which until its introduction was impossible. Bismuth provides a means of dealing adequately with the Wassermann-fast patient and of securing a permanent negative.

There can be no question but that metallic bismuth is the preparation of choice, not only from the point of view of avoiding toxic effects, but also on account of the mode of action of the element within the body. Finally, emphasis cannot be laid too strongly upon the absolute necessity which exists for a good technique in administration if one would avoid pain, discomfort, and the danger of injecting into the blood-stream."

Dr. S. Lomholt writes on the pharmacology of bismuth; the rate of absorption is a very important point, and watery solutions must be preferred to oily ones for practical use. He prefers the hydroxide, with glycerine added to ensure homogeneous suspension; 12 grammes of basic bismuth nitrate are dissolved in dilute nitric acid. A surplus of ammonia is then added, resulting in a fine precipitate of bismuth hydroxide. This precipitate is next very carefully washed, preferably under aspiration; then 10 c.c. of pure glycerine and 40 c.c. of sterile water are added and the suspension is ready for use; the dosage being 1 c.c. or about 20 c.gm. once a week. This preparation is very cheap and suitable for use on a big scale, as it costs less than an anna for a dose of 0.2 gm.

Dr. R. N. Ironside writes on the treatment of general paralysis by malarial inoculation. This line of

treatment is not the wonderful one that many continental writers think it is, but it is a useful measure. Success depends upon choosing early cases free from arterial disease and bronchial infection; and the treatment should be withheld from all debilitated paretics and from all patients over 50 years of age. The method of inoculation giving most satisfactory results is by infection by mosquitoes.

A useful article follows by Dr. H. C. Semon on skin affections commonly mistaken for syphilis, an article which should be read in the original. There is perhaps no commoner mistake in medical practice in this country than to mistake psoriasis, tinea and even seborrhoeic dermatitis for a syphilide and send the patient for a Wassermann reaction test.

It will be seen that *The British Journal of Venereal Diseases* is a journal full of interest to the clinician and laboratory worker alike.

Vitamin-Content of the Banana.

(*The Medical Review*, March 1925, p. 73.)

EVA SORP (*Norsk Mag. f. Lægevidenskab*, p. 732) says that the banana is in many respects an ideal food. It is easily digested and it contains from 19 to 20 per cent. of sugar and starch, from 4 to 5 per cent. of protein, and from 0.5 to 1 per cent. of fat. Various investigators have found that there are large quantities of C vitamins and a certain amount of B vitamins in it. But there is a conflict of evidence over the existence of A vitamins. To clear up this point about 25 young rats, each weighing from 30 to 40 grams, were fed on an A vitamin-free basal diet until they began to show signs of A vitamin deficiency, and most of them had developed advanced xerophthalmia. The rats were then grouped in 3 classes, to each of which a different banana ration was given. The banana was eaten with avidity, and it was found that the first group of rats, to whom an unlimited supply of banana had been given, showed little improvement during the first fortnight. But afterwards rapid improvement was observed, and when the experiment was completed after 10 to 12 weeks, the rats were well developed, and most of them had completely recovered from the ill-effects of the A vitamin-free diet. Another group of rats was given 2 gm. of banana daily, per rat. The rats in the remaining group were each given only 1 gm. of banana daily, in addition to the basal A vitamin-free diet, and it was anticipated that this supply of banana would be inadequate to combat the effects of severe A vitamin deficiency. But the rats in this group thrived practically as well as did those in the first group. The writer concludes that the banana contains vitamins capable of preventing and curing diseases due to A vitamin deficiency, and that, to a less extent, or at any rate more slowly, the vitamins in the banana promote growth. Applying these observations to human beings, she points out that 1 gm. of banana a day is to a 50-gram rat as 4 or 5 bananas are to a 3-year old child. But it is probable that this weight for weight comparison is misleading, and that considerably less than 4 or 5 bananas a day should be sufficient to provide a 3-year old child with enough A vitamins.

Reviews.

THE MEDICAL ANNUAL: A Year Book of Treatment and Practitioner's Index, 1925. Bristol: John Wright & Sons, Ltd. Pp. 608. Price, 20s. net.

THIS is the forty-third volume of a yearly publication which most medical men regard as indispensable. The high standard of the previous issues has been fully maintained and the Medical Annual continues to supply the medical man with a critical digest of all the most important work of the proceeding year.

Aug., 1925.]

The contributors, twenty-eight in number, are recognized authorities on the subjects with which they deal so that the contents are far from being mere abstracts, they represent real contributions to medical science culled and critically presented by experts.

Medical men in India and in the tropics generally are specially favoured, the most important tropical diseases are dealt with by Sir Leonard Rogers, and eye diseases by Lieutenant-Colonel Lister.

The sections on eye diseases are remarkably complete and instructive, an exceptionally interesting section is that on the slit lamp microscopy of the living eye with two coloured plates from the book of Prof. Vogt. In the other sections on eye diseases, the author gives us the benefit of his ripe experience of ophthalmology in India and Europe.

The contributors and publishers continue to earn the hearty gratitude of all English reading medical men, especially those who have to work in isolation.

A complete annual course of post-graduate instruction at a cost of twenty shillings is brought within the reach of all.

Altogether the book is indispensable for all medical men who desire to give their patients the benefit of the recent discoveries of medical scientists.

SEWAGE DISPOSAL IN INDIA AND THE EAST.—

By George Bransby Williams, M.I.C.E., F.R.S.I., F.R.C.S., Chief Engineer, Public Health Department, Bengal. Calcutta and Simla: Thacker, Spink & Co., 1924. Pp. 230, with 52 illustrations. Price, Rs. 10-8.

THIS is the most important treatise on the treatment and disposal of sewage in the East since Fowler and Clemesha's report on the working of septic tanks in Bengal and Clemesha's "Sewage Disposal in the Tropics." These, however, dealt with the problem in a very specialised and restricted manner and were largely a result of the work done by these experts on septic tank latrines in Bengal which they did so much to develop. The present book, however, is much more ambitious and surveys the subject in a wide comprehensive manner. Sewage is sewage all the world over and the problem of its disposal is everywhere essentially the same—it has to be converted into stable inoffensive bodies devoid of danger to the community by means which should be at once suitable, rapid, devoid of nuisance and economical. The principles remain the same but their application must vary with the composition of the material to be dealt with, the climate, the local geographical conditions, etc., and the amount of money available. It is on account of these differences that the methods of sewage disposal in India must vary as compared with European and American methods not only generally but in particular localities though the principles remain the same. The wide experience of the author of European, African and Indian conditions is evident throughout the book.

The principles of sewage treatment are firstly clearly enunciated, then the differences between domestic sewage in European, American and Indian communities are discussed; the development of scientific methods explained and clear descriptions of actual works in India and elsewhere given. Perhaps the most interesting chapter of the book is on sewage irrigation—a full description of the sewage outfall works at Dacca designed and carried out by the author is given. The preliminary experiments and the results of cultivation as shown by the table on p. 108 and the accompanying illustrations look almost too good to be true; as much as 120,000 gallons per acre per day being applied for a month at a time without sewage sickness or ponding. Such results on Bengal alluvial soil are distinctly encouraging and it is hoped that the sanguine optimism expressed will be fulfilled. The activated sludge process is clearly described and the illustrations of the installation at the Bengal Engineering College at Sibpur make the process quite clear. A very important chapter is the one dealing with sludge disposal which may be said to be the bugbear of every sanitary engineer.

The author is of opinion that the system of sedimentation and land irrigation combined with air drying of the sludge during the dry weather and sludge digestion during the rains (after the methods of Watson of Birmingham and as carried out at Pretoria) may prove a satisfactory solution of the Indian sewage disposal problem and the Tittagar Sewage Works which are now under construction have been designed on this principle. The installation at Dacca and at Tittagar will be followed with great interest by many interested persons both of the engineering and medical professions and it is hoped that Mr. Bransby Williams will from time to time publish the results obtained from these disposal works. Especially valuable is the final chapter on "general considerations" where the important factor of finance is considered. A table is given of the amount spent by various municipalities in Bengal on conservancy and maintenance of drains. This averages over one rupee per head of population, Howrah leading with Rs. 2-11-0 per head. The majority of these towns have a hand and cart removal system with trenching. In a town like Howrah, with nearly 200,000 inhabitants the amount of daily labour and daily nuisance can be imagined and this at a cost of 4 lakhs of rupees per annum. Mr. Williams shows that it is very unlikely that any Bengal Municipality would be able to finance a water-borne sewage system with the ordinary available revenue, but points out that the saving in sickness rate would go a long way towards making up the deficit. But it is difficult to get a primitive people to break away from Nature and to break the various vicious circles which result from too close a contact between human beings and human excreta, circles which are the cause of so many diseases in tropical countries—hookworm, enteric, cholera and dysentery. The book will be appreciated by the large number of interested people in India and will add to the author's already high reputation as a sanitary engineer. It is well bound and the numerous illustrations which are well reproduced add considerably to its value.

OPERATIVE SURGERY.—By Warren Stone Blackham, M.D., F.A.C.S., formerly Surgeon, Manhattan State Hospital, New York; and Instructor in Operative Surgery, College of Physicians and Surgeons, Columbia University. In six volumes. Philadelphia and London: W. B. Saunders Co. Vol. V., pp. 880; Vol. VI., pp. 980. Price, 50s. net per volume, also free Index volume, pp. 189.

THESE two volumes complete this enormous work on operative surgery. In the reviews of the previous volumes we have expressed our opinion on the scope and character of the work in general, so that beyond noticing the contents of the present volumes there is nothing to add to what we have already said. Volume V opens with the operations upon the colo-recto-anal tract and so completes the section on the alimentary canal. All the well-known operations will be found here and the descriptions are as usual very full and admirably illustrated. We would suggest that an illustration of the arterial supply of the sigmoid and rectum would be helpful in making clear the importance of the correct placing of the ligatures in high excisions of the rectum. The minor rectal operations are illustrated by numerous figures all admirably clear. The descriptions of the methods of dealing with fissure in ano do not make clear the real object of the operation by incision, which is to obtain adequate drainage and not to paralyse the sphincter, the latter is neither necessary nor desirable. The rest of the volume deals with the surgery of the kidneys, ureter, bladder and male genitals. As usual, a very great number of methods is detailed, without much guidance to help the reader to choose the best, but this is the case with the whole work. No less than 16 methods of uretero-ureterostomy are described, but Peter's operation for exstrophy of the bladder by implantation of the ureters into the rectum, the best of all methods is not mentioned. Fig. 4677 is supposed to represent the technique of catheterization of the ureters, the cystoscope is so placed that the

prism looks directly upwards, at an angle at which it would appear impossible that the ureteric orifices would be visible, the usual method with the beak of the instrument pointing downwards is given us as an alternative technique, but it is the method universally used and the only method which need be described. On the whole, however, these chapters form a well-balanced series, the descriptions of urethral and bladder technique being particularly good.

Volume VI opens with the operations on the prostate and seminal vesicles, methods of prostatectomy being, of course, the longest section. The author's remarks on the merits of suprapubic and perineal prostatectomy are very cautious and we regret that he has not seen fit to give us the tabulation of the points for and against each operation which he had prepared, but found it so contradictory that he decided to omit it. The various methods of performing these operations are very well and carefully described, the descriptions of the perineal methods being much more detailed than is usual. Thomson Walker's operation is, we suppose, too recent to be included. The rest of this volume deals with gynaecological and obstetric operations, a department in which the reviewer does not feel competent to criticise; at the end are found some orthopedic operations which could not be classified under any of the previous sections. The index volume appears to be very complete. We have said before that we rank this work very high, it is a monument of industry and erudition of which the author may well be proud. That it does not make particularly interesting reading is a fault inherent in works of this character as well as in dictionaries and encyclopedias, it cannot be held to detract from their merits in their own sphere. The author set out to write a work of this character and he has succeeded admirably. Its proper place is on the shelves of a reference library and we recommend all medical libraries to purchase it.

ABT'S PEDIATRICS.—Vol. IV. Practical Medicine Series, 1924. Chicago: The Year Book Publishers. Pp. 381. Price, \$2.00.

We congratulate the Year Book Publishers, Chicago, on having produced this year one of those admirable practical medicine series devoted for the first time exclusively to pediatrics. Hitherto it has shared its pages with orthopedics, and the fact that this year it requires a separate volume is significant of the growing interest in children's diseases. The literature has increased both in quality and quantity, and this book selects all that is best in recent advances. The publishers are fortunate in having this volume edited again by the well-known pediatrician Dr. Abt whose criticisms are brief and pithy, characterised by a careful judgment, wise philosophy and delightful humour. Lest the young and enthusiastic general practitioner should swallow all that is new, the experienced editor adds a fair yet definite note of warning, e.g., when the value of the banana is extolled in the treatment of coeliac disease he tersely adds this comment:—"It may be good; time will tell."

The subject-matter is well arranged, starting with diseases of the newborn, feeding of infants and nutritional disorders, proceeding to infectious diseases and thence to diseases of the different systems, so that the busy practitioner can refer to any clinical condition quickly. Each subject treated is printed in bold type, the author's name stated, and the journal from which the summary was made given in a footnote so that the original article can be consulted.

We commend this volume to all as containing in brief the best collection of recent work in the department of pediatrics.

THE STATICS OF THE FEMALE PELVIC VISCERA, VOL. II.—By R. H. Paramore, M.D. (Lond.), F.R.C.S. (Eng.). London: H. K. Lewis & Co., Ltd., 1925. Pp. xx plus 424, with 58 illustrations. Price, 24s. net.

In volume II of "The Statics of the Female Pelvic Viscera," R. H. Paramore has advanced another step

towards the still unsolved puzzle of prolapse and as to how the viscera are normally retained in the pelvis. It is complementary to volume I, but it does not conclude with the mystery explained.

It shows a most methodical investigation of the problem, for the author surveys the whole history of the treatment of prolapse from 1742 to 1899. He has followed the evolutionary method tracing the developments in chronological order, yet his book is no mere description of antiquated procedures but a reasoned critical survey wherein he elucidates every advance in thought and in surgical performance and ascribes to each writer and operator due praise for any advance to the solution of the problem of pudendal hernia. The aim too is constructive—not to minimise the work of these pioneers but to seek out whatever in it was good and show how later operators have improved on older conceptions and procedures.

The first measures were necessarily experimental and therefore unscientific. In more recent decades the treatment has tended in two directions, a selection of cases and the employment of several different measures in concert.

The author shows a rare judgment in examining the results of these various surgical procedures, yet he does not consider operations alone but tries to get at the underlying ideas of prolapse which prompted these operations. His own idea, more hinted at than stated,—is that a difference in pressure obtaining about the body and cervix of the uterus in some corrected form is the idea which must prevail.

He strives to get away from indefiniteness in thought and inexactitude in terminology and suggests the name "pudendal hernia" as connoting the pathology.

He concludes that support from below and suspension from above for the cure of prolapse have failed and that it is due to a loss of equilibrium in the realm of abdomino-pelvic dynamics. We shall welcome volume III whether it shows us how to restore that equilibrium or not, for volume II is well written, well illustrated, well produced and a perusal of it will repay any gynaecologist before he proceeds to any radical operation for prolapse.

CHAVASSE'S ADVICE TO A MOTHER.—By G. T. Wrench, M.D., B.S. (Lond.). Nineteenth Edition. London: J. & A. Churchill. Pp. 346. Price, 2s. 6d. net.

The publication of the 19th authorised edition of Dr. Chavasse's "Advice to a Mother" speaks well for the value and undiminished popularity of this eminently practical little volume. It has been revised by G. T. Wrench, past assistant-master of the Rotunda Hospital, Dublin, and it is written in a simple, breezy style calculated to captivate the attention of any mother anxious about the management of her children.

Like all Gaul it is divided into three parts sensibly treating the three stages in development, infancy, childhood and boyhood, and giving useful advice on feeding, teething, clothing, exercise and common ailments. The chapter on infant feeding has been re-written but we note the author does not believe in four-hourly feeds and in the early weeks allows one night feed. The other chapters have been brought up to date and embody the latest teaching. The care of children in the tropics is relegated to the concluding four pages so that there are many points on which the mother in India will search in vain for enlightenment. At the same time we commend the book to the mother in the *mofussil* as a useful source for reference in emergencies and for the treatment of minor illnesses.

ESSENTIALS OF INFANT FEEDING.—By E. A. Barton. London: H. K. Lewis & Co., Ltd., 1925. Pp. viii plus 80. Price, 3s. 6d. net.

E. A. Barton in his "Essentials of Infant Feeding" presents the main outlines of this subject in an easily readable and easily assimilable little book of 80 pages. He writes for the average student not for the pediatrician, and he has succeeded in his aim of compressing

much valuable information into small compass and at small cost. The teaching is practical. The essential points in breast feeding, the constituents of cow's milk, the value of vitamins, the need for accuracy in artificial feeding are ably set forth in such a manner that their perusal will benefit alike the Indian student who wishes to profit by his attendance at any infant clinic and the Indian practitioner who finds to-day that he requires more knowledge of the important subject of infant feeding.

Annual Reports.

TRIENNIAL REPORT OF THE PATNA MENTAL HOSPITAL FOR THE YEARS 1921-23. BY LIEUTENANT-COLONEL H. R. DUTTON, I.M.S. PATNA: SUPERINTENDENT, GOVT. PRINTING, BIHAR AND ORISSA, 1924. PRICE, 14 ANNAS.

THIS hospital has accommodation for 275 male and 66 female patients, and the numbers treated varied from 316 in 1921 to 331 in 1923. The percentage discharged cured was 8.39. Improved dietaries and other prophylactic measures reduced the daily sick rate from 57.5 in 1921 to 39.56 in 1923. Thirty cases of tuberculosis were treated during the period, being segregated in an open ward and given systematic injections of sodium marmhuate, and Colonel Dutton speaks well of the results of such treatment. The admissions for dysentery rose from 20 in 1921 to 36 in 1923, chiefly owing to relapsing amoebic infections. An increase is also to be noted in ankylostomiasis, said to be due to patients of dirty habits eating garbage and earth. The average number of deaths was 23 as against 35 for the previous triennium. Criminal lunatics increased from 116 in 1921 to 122 in 1923.

The chief types of insanity dealt with were mania, melancholia, mental stupor, insanity due to *Cannabis indica* and alcohol, dementia præcox, imbecility and idiocy. The chief ætiological factors concerned were ganja, alcohol, toxic causes, critical periods of life and mental stress. The total cost of the mental hospital during the triennium was Rs. 1,80,065, and the average cost per patient per annum from Rs. 204 to Rs. 222, whilst there was an average annual profit of Rs. 2,410 from goods manufactured at the hospital. Diets were liberal, and the sanitary state of the hospital was good. The drinking water is chlorinated. The stools of all patients were examined, and those infected with intestinal parasites were systematically treated. Prophylactic quinine and thymol were also used.

THE SOUTH AFRICAN INSTITUTE FOR MEDICAL RESEARCH, JOHANNESBURGH. ANNUAL REPORT FOR 1923.

THE annual reports of this institute are always interesting reading; for, in addition to a large volume of routine work, there is also a considerable output of interesting research work, and the staff include such well-known workers as Dr. Watkins-Pitchford as Director, Sir F. Spencer Lister as bacteriologist, Dr. Annie Porter as parasitologist and Professor H. B. Fantham as honorary protozoologist. Among other general activities of the year was the preparation of an exhibit for the British Empire Exhibition at Wembley, illustrating "miner's phthisis," a further exhibit dealing with work in South Africa, and the preparation of a cinema film illustrating bilharzial life cycles and transmission.

On the research side, an outbreak of cerebro-spinal meningitis which occurred in July was investigated. Of 36 strains of the meningococcus from African or Indian patients, 25 belonged to Lister's group E, as

also did 10 out of 23 strains from European patients. Gordon's type 1 meningococcus, previously prevalent in the area, was almost absent in the outbreak. As a routine prophylactic against lobar pneumonia, all new arrivals at the mines are vaccinated three times with a pneumococcal vaccine, and in 1923 a dose of 1,000 million of Gordon's type 1 meningococcus was added to the pneumococcus vaccine. Whether this was partly responsible for the great diminution in the incidence of this strain, however, is problematical, since from 1920 to 1922 its incidence had fallen from 72 per cent. of all strains tested to 27 per cent. Of 18 strains of pneumococcus isolated from cerebro-spinal fluid obtained by lumbar puncture, no less than 15 did not correspond with any known group.

Considerable work was done on filter-passing organisms isolated from (a) cases of epidemic influenza, and (b) cases of African horse-sickness. The former was reported on by Dr. Olitsky to be identical with the strain isolated there; the latter appear to belong to the same group as *Bacterium pneumosintes*, the filtrable virus supposed to be the cause of epidemic influenza. Animals inoculated with the isolated virus developed symptoms typical of horse-sickness, but there appeared to be but little evidence of subsequent immunity.

An informal conference was held on the whole question of regulations with regard to meat-producing industries. It was decided that if a carcass shewed not more than ten cysticerci, and if these were not widely distributed, the infected part should be excised, and the parts not affected passed as fit for consumption after being kept at a temperature not higher than 10°C., for at least twelve weeks.

Several massive infestations with *Ascaris lumbricoides* have been encountered at Johannesburg, including four cases of intestinal obstruction, from one of which 851 worms were removed at operation. One of the four cases proved fatal from gangrene of the jejunum and perforation. In connection with schistosomiasis, two or perhaps three potential hosts of *S. haematobium* have been found among snails of the genus *Isidora*.

In connection with miner's silicosis it was found that guinea-pigs which had inhaled phthisis-producing dust, after either intraperitoneal inoculation with tubercle bacilli, or intratracheal inoculation with pathogenic cocci, developed a condition of the lungs similar to that met with in miner's phthisis. In the majority of cases of miner's phthisis, the condition present is really a silico-tuberculosis, the tubercular infection being grafted on to a pre-existing silicosis. Experiments are in progress to determine the best methods of ventilation, cooling and dust control.

TRIENNIAL REPORT OF THE MENTAL HOSPITALS IN BENGAL FOR THE YEARS 1921-1923. BY MAJOR-GENERAL R. HEARD, C.I.E., K.H.S., M.D., I.M.S. CALCUTTA: BENGAL SECRETARIAT BOOK DEPOT, 1924. PRICE, RS. 3.

ONE of the notable events of the triennium was the change in nomenclature from "lunatic asylums" to "mental hospitals," a change which indicates a new policy with reference to mental patients, who are in the majority of instances capable of cure or improvement. The institutions at work during the triennium were the mental hospitals at Berhampore and Dacca, the observation ward at Bhowanipore, and the ward for insane lepers at Gobra, the accommodation in which is for 764, 343, 4 and 10 patients respectively. The annual average number of patients was 1,215, and 41 paying private patients were admitted during the period. An average number of 102 patients a year were discharged cured. One escape of a criminal lunatic occurred in 1923 from the Berhampore hospital, but the patient was subsequently run over by a train.

The daily average number of sick was 118, malaria being the disease chiefly responsible; dysentery was

epidemic in the Berhampore hospital in 1923 and a segregation ward had to be opened. There was a recrudescence of influenza in 1921, whilst tuberculosis was also prevalent. The deaths averaged 70 per annum as against 102 per annum in the previous triennium. Of the types of insanity dealt with mania was the commonest, whilst 320 patients were admitted suffering from the effects of *Cannabis indica*. The superintendents of the hospitals complain that very little attention is paid by committing authorities to furnishing the necessary information with regard to patients sent in. The average annual income amounted to Rs. 2,98,483 as against an annual average expenditure of Rs. 3,17,925, the chief item of increase being the opening of the new observation ward at Bhowanipore. Profits from manufactures varied from Rs. 8,438 to Rs. 14,124 per annum. Dietaries were improved, especially at Dacca, where there was an ample supply of vegetables from the hospital garden and an issue of fish or meat on alternate days. At the Berhampore hospital a reading room and club for patients were opened, also an amusement fund, supported by public subscriptions. Considerable structural improvements were effected at the Berhampore Hospital, whilst a change in administration authorised the superintendent of the observation ward at Bhowanipore to become a certifying officer. In 1918 all European patients at Bhowanipore and Berhampore were transferred to the mental hospital at Ranchi; an Indian mental hospital is now in course of construction also at Ranchi, and it is hoped in 1925 to transfer to this hospital all Indian patients from both the Berhampore and Dacca hospitals.

Correspondence.

DIABETES AND INSULIN TREATMENT IN BENGAL.

To the Editor, "INDIAN MEDICAL GAZETTE."

SIR,—In the June issue of your *Gazette* Dr. Lal Mohan Ghosal, Demonstrator of Physiology, Medical College, Calcutta, published a paper entitled "Diabetes and Insulin Treatment in Bengal" in which he has made some sweeping and unwarranted statements about insulin treatment in this country. He begins with the statement that "insulin treatment in diabetes has become a common practice but so far as my experience goes both from hospital and private cases, not much benefit has accrued from it." In another place he writes "but alas in India the results are far from what was expected, very few cases are known to have derived benefit from it—far from getting cured."

As my experience in this line of treatment in Bengal covering about 400 cases of diabetes of various grades of severity is entirely contrary to his conclusions, I write these few lines in order to show that the basis of Dr. Ghosal's conclusions is fundamentally defective and that therefore they are unjustifiable and unacceptable.

Having made the hasty and ill-founded statement that insulin treatment in Bengal is more or less useless, the writer proceeds to find the reason of his assertion. He doubts whether the diabetes in Bengal is due to any pancreatic defect at all and having according to his own statement found no direct means to determine the pancreatic defect he falls back upon Cammidge's method of stool analysis and Cammidge's reaction in urine as the best means of determining the degree of pancreatic defect. He evidently takes it for granted that "pancreatic deficiency" as evidenced by Cammidge's method of stool examination includes the deficiency of the internal secretion (insulin) of the pancreas as well. This is where the mistake lies which destroys the whole value of his observations.

I am sorry that space will not permit me to discuss the merits of the Cammidge reaction. I can only say that Cammidge's reaction in urine is not made use of

nowadays and I would support this statement by quoting the opinion of the famous Mayo clinic on the value of the test. It says:—"If knowledge of the clinical histories and other factors of the personal equation be eliminated, the end results, judged by Cammidge's own criteria, must be considered, as a means of diagnosing disease of the pancreas both valueless and misleading." The same conclusions have been arrived at by many other distinguished workers in regard to this test.

Cammidge's method of stool analysis is still done and is of use in determining the degree of deficiency of the external secretion of the pancreas. This according to Cammidge's own statement is as follows:—"...a negative or low trypsin index and a high percentage of unabsorbed fat including an excessive proportion of unsoaped fat and neutral fat, in the quantitative analysis points to deficiency of the external secretion of the pancreas." This test does not give us any idea as to the deficiency or otherwise of the internal secretion of the pancreas manufactured by its islet cells, with which we are mainly concerned in diabetes.

On the basis of this Cammidge's test on the stools and by the degree of "pancreatic deficiency" indicated thereby, Dr. Ghosal groups out his cases of diabetes, a procedure which is open to grave objection. This classification is as unsound as it is unscientific, because as I have already stated, pancreatic deficiency as determined by Cammidge's test does not help us in finding the degree of deficiency of the internal secretion which is universally accepted as the causal factor in true diabetes. Moreover, it has satisfactorily been proved long ago that even ligature of the pancreatic duct, making it impossible for any external secretion of the organ to reach the intestine, fails to bring about glycosuria so long as the islet cells remained healthy.

It is interesting to note that nowhere in the whole of Dr. Ghosal's paper is there any mention of the glucose tolerance test and only a passing reference has been made in respect to blood sugar. This gives us the most reliable information as to the degree of damage done to the islet cells of the pancreas and which may be taken as the direct means of determining pancreatic deficiency in its relation to diabetes.

In summing up I would lay stress on the following points:—

(1) That the degree of "pancreatic deficiency" which Dr. Ghosal endeavours to bring out by Cammidge's test is not the kind of pancreatic deficiency with which we are concerned in cases of true diabetes—it does not show us the degree of damage done to the islet cells.

(2) That there are direct means by which the degree of damage done to the islet cells could be determined, the best of which according to eminent authorities on the subject is the glucose tolerance test.

(3) Lastly, Dr. Ghosal's statement as to the futility of insulin treatment of diabetes in this country would not stand the test of impartial enquiry into the matter. So far as my experience goes, insulin is not only palliative but in suitable cases a curative agent as well. It may be stated that I have had under my care a good number of cases of diabetes—some of which have yielded completely and the rest were decidedly benefited by it.

The difficulty of insulin treatment, as I pointed out in a previous paper in your esteemed journal, lies in the selection of proper cases. If the cases are properly selected and the relation of the dosage of insulin to the carbo-hydrate intake of the patient strictly adhered to, the results that will follow, will, I am sure, make Dr. Ghosal change his present opinion about the efficacy of insulin in the treatment of diabetes mellitus.—Yours, etc.,

J. P. BOSE, M.B., F.C.S.,
 Mitra Research Worker on Diabetes,
 Calcutta School of Tropical Medicine
 and Hygiene.

CALCUTTA,
 3rd July 1925.

Service Notes.

APPOINTMENTS AND TRANSFERS.

Lieutenant-Colonel S. R. Christophers, C.I.E., I.M.S., is appointed to officiate as Director, Central Research Institute, Kasauli, *vice* Lieutenant-Colonel W. F. Harvey, C.I.E., I.M.S., with effect from the date on which he assumes charge of his duties.

Lieutenant-Colonel C. A. Gill, I.M.S., Officiating Director of Public Health, Punjab, held charge of the current duties of the Office of Inspector-General of Civil Hospitals, Punjab, from 8th to 18th May 1925 in addition to his own duties.

Lieutenant-Colonel G. Tate, I.M.S., is appointed to officiate as Inspector-General of Civil Hospitals, Punjab with effect from the 19th May 1925 and until the return from leave of Colonel Bakhle.

The services of Major E. E. Doyle, D.S.O., I.M.S., are placed permanently at the disposal of the Government of Bombay, with effect from the 27th March 1925, for employment in the Jail Department.

In supersession of the orders already issued, the services of Captain C. de C. Martin, M.B., I.M.S., an officer of the Medical Research Department, are placed temporarily at the disposal of the Government of Burma for appointment as Officiating Assistant Director, Pasteur Institute, Rangoon, with effect from the date on which he assumes charge of his duties.

Captain A. S. Fry, F.R.C.S.E., I.M.S., is appointed to officiate as Civil Surgeon, Simla (East), *vice* Lieutenant-Colonel J. M. A. Macmillan, with effect from the 12th May 1925.

The services of Captain Jamal-ud-Din, M.B., I.M.S., are placed temporarily at the disposal of the Government of the Punjab, with effect from the date on which he assumes charge of his duties.

LEAVE.

Colonel C. R. Bakhle, I.M.S., Inspector-General of Civil Hospitals, Punjab, is granted leave on average pay for 4 months, including privilege leave for 5 days, with effect from the 8th May 1925.

Lieutenant-Colonel J. M. A. Macmillan, M.D., F.R.C.S., I.M.S., Civil Surgeon, Simla (East), is granted two months' leave on average pay, with effect from the 18th April 1925.

In modification of the orders already issued, Lieutenant-Colonel W. R. Battye, D.S.O., I.M.S., an Agency Surgeon, is granted leave on average pay for 3 months and 20 days combined with leave on half average pay for 2 months and 11 days, under the Fundamental Rules with effect from the 7th May 1925.

Lieutenant-Colonel J. B. D. Hunter, O.B.E., I.M.S., an Agency Surgeon, on return from leave, is posted as Legation Surgeon, Nepal, and *ex-officio* Assistant to the British Envoy at the Court of Nepal, with effect from the 18th May 1925.

Captain R. H. Malone, M.D., I.M.S., Acting Director, Bombay Bacteriological Laboratory, is granted leave on average pay for four months combined with furlough under military rules for two months and study leave for six months, with effect from the 20th June 1925 or subsequent date on which he avails himself of the leave.

PROMOTIONS.

The promotion to his present rank of Major M. L. C. Irvine, M.B., I.M.S., notified in Army Department Notification No. 225, dated the 10th February 1922, is antedated from the 29th January 1922 to 29th July 1921.

The promotion to his present rank of Major M. Purvis, M.B., I.M.S., notified in Army Department Notification No. 1306, dated the 4th August 1922, is antedated from 30th July 1922 to 30th January 1922.

The provisional promotion of Captain P. A. C. Davenport, I.M.S., to the rank of Captain as notified in Army

Department Notification No. 236, dated the 22nd February 1924, is confirmed subject to His Majesty's approval.

Lieutenant to be Captain (Provisional).

G. H. Fitzgerald. Dated 10th June 1924.

Lieutenant to be temporary Captain.

R. T. W. Stoney. Dated 21st January 1920.

RETIREMENTS.

Lieutenant-Colonel A. T. Gage, C.I.E., M.B. 13th May 1925.

Lieutenant-Colonel E. C. C. Maunsell, M.B. 26th March 1925.

Lieutenant-Colonel F. D. S. Fayrer. 8th April 1925.

Lieutenant-Colonel A. Leventon, C.I.E., F.R.C.S.I. 27th April 1925.

Major C. H. Cross, I.M.S., on account of ill-health, 5th April 1925.

Major J. A. Cruickshank, M.C., I.M.S. 21st April 1925.

Office of the Director-General, Indian Medical Service.

CIRCULAR No. 1-C.

Simla, the 30th April 1925.

Reference this office circular No. 1-C., dated the 11th July 1921. The High Commissioner for India and the Medical Adviser to the Secretary of State for India have again brought to notice irregularities in regard to the submission, for approval of courses of study prior to the commencement of such courses. It is pointed out that under Rule 5 of the Study Leave Rules (General) and Rule 7 of the Indian Medical Service Rules, an officer is required, when applying for study leave in India, to submit, in addition to the Audit Officer's certificate, particulars of the course or courses of study contemplated and any examinations which he proposes to undergo.

It not infrequently happens, particularly in cases where study leave alone has been granted, or where it is combined with a short period of ordinary leave, that an officer takes up a course immediately on arrival in the United Kingdom without prior reference to the High Commissioner's Office or India Office* apparently on the assumption, probably to some extent excusable, that such reference, in view of the fact that he has already submitted his programme in India, is unnecessary.

Further, although Rule 13 of the general and Rule 7 of the Indian Medical Service Study Leave Rules provide that particulars of the study leave should be furnished to the High Commissioner's Office or India Office this is on occasions not done, or if not omitted altogether, is delayed so long as to render it useless for purposes of the exercise of effective control by the High Commissioner's Office or India Office.

Either of these circumstances makes it difficult or even impossible for the High Commissioner's Office or India Office to perform its function or supervising from the beginning an officer's study programme.

It would also appear, from recent experience of cases where an application for study leave is deferred until after arrival in the United Kingdom that some officers are unaware of the rule that a course of study should receive the prior approval of the High Commissioner or India Office and instances have occurred of application for study leave and for allowance in respect of study already embarked upon or completed.

It should be brought to the notice of all Indian Medical Service Officers that it would facilitate matters if all officers, whether granted study leave in India or whether they apply for it in the United Kingdom, should

* For Officers in military.

submit their programme to the High Commissioner or India Office before embarking on them.

Attention is also invited to paragraph 10 of the Study Leave Rules under which in order to qualify for the grant of study leave or for the receipt of study allowance a definite course of study must be approved as suitable by the Director-General, Indian Medical Service or by the High Commissioner, or Medical Adviser to the Secretary of State—otherwise the study allowance will not be admissible.

R. CHARLES MACWATT,
*Major-General,
Director-General, Indian Medical Service.*

NOTES.

CONFERENCE ON THE PROBLEM OF VENEREAL DISEASES.

THE National Council for Combating Venereal Diseases has decided to organise an Imperial Social Hygiene Conference to be held at the British Empire Exhibition, Wembley, on October 5th, 6th, and 7th of the present year.

It may be remembered that an Imperial Social Hygiene Congress was held at Wembley in May 1924, and was attended by many representatives of Government Departments and Local Bodies in the United Kingdom, of charitable and other organisations and of the Overseas Dominions including India. Those who were privileged to be present on that occasion will not soon forget the deeply-interesting nature of the papers read and the discussions carried on. It was perhaps a drawback that in the few days at the disposal of the Congress a great variety of important subjects were touched on, of which time did not permit the full discussion. At the Conference which will be held during the coming October, it has been decided to limit the discussion to Overseas problems and to take these up more in detail and more especially from the point of view of the expert. This will make the Conference all the more valuable for members of the medical profession who will have the opportunity of learning the views held, and weighing the experience gained in other parts of the Empire, while at the same time contributing such facts as India can bring to the common storehouse of knowledge. One day of the Conference will be devoted to a consideration of the medical aspects of venereal diseases and to the latest methods of diagnosis and treatment.

The widespread prevalence of venereal diseases and their serious consequences both to the individual and to the race has been recognised by most nations during the last twenty years. Energetic measures are being taken to combat them especially in Australia, Canada and the United Kingdom, and these measures are being attended by a gratifying amount of success. In India, as many practitioners have testified, the diseases are also widespread, especially in the cities. Speaking at the Congress, Sir Gerald Giffard, as representing Madras, put the incidence of the diseases at 25 per cent. of the population, and other speakers placed it even higher. So far, no action has been taken in India to combat the scourge nor is there outside the medical profession any real knowledge of the seriousness of the situation and of the growing menace to the public health.

Those who are organising the Conference hope that many medical practitioners from India, and others whose experience fits them to speak with authority, will attend the meetings either as representatives of public bodies or as private individuals.

Copies of the Proceedings of the 1924 Congress, which gives a valuable synopsis of the recent advances

in dealing with venereal diseases in all parts of the Empire (price 6/4, post free) may be obtained from the Honorary Secretary of the National Council for Combating Venereal Diseases, 102, Dean Street, Oxford Street, London, from whom also more detailed information regarding the coming Conference may be obtained.

MESSRS. C. BAKER'S PRICE LIST OF MICROSCOPES AND ACCESSORIES.

THE catalogue recently issued by Messrs. C. Baker, 244, High Holborn, London, W. C., contains many interesting items. The "R. M. S." microscope with all fittings for ordinary and for dark ground work at £67-3-0 is a *model de luxe*; the "D. P. H. 1 a" model for ordinary bacteriological and hæmatological work at £45-2-6 is good value; whilst the "stand T. D." fitted for all ordinary laboratory and bacteriological work at £42-12-6 is a good student's microscope. The Greenough dissecting microscope is one with a well-deserved reputation and comfortable to work with. A new lens introduced by the firm is a 3/4th inch oil immersion objective of N. A. O. 95, a lens useful for all types of high power work and especially suitable for dark ground illumination. Many kinds of interesting illuminating apparatus are included in the list, and also apparatus for drawing, projection and microphotography. The catalogue is one which will interest laboratory workers and research students everywhere.

MESSRS. HICKS' THERMOMETERS.

MESSRS. JAMES J. HICKS, the manufacturers of Hicks' Clinical Thermometers, whose advertisement appears elsewhere in this issue, are perhaps the premier thermometer makers in the world.

The firm has a huge business founded upon sound workmanship, and each thermometer is tested by an expert before it leaves the factory. The Indian agents are Messrs. Allen and Hanburys, Ltd., Block E, Clive Buildings, Calcutta, who will be pleased to forward price lists on application.

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Original Articles.

NOTES ON SOME METHODS FOR DIAGNOSIS OF HOOKWORM INFECTION AND FOR ESTIMATING THE EGG OUTPUT.

By ASA C. CHANDLER, M.S., Ph.D.,

(From the Hookworm Research Laboratory, Indian Jute Mills Association Endowment, Calcutta School of Tropical Medicine and Hygiene).

LANE (1923-24) has recently described a new method for diagnosis of hookworm infection by direct centrifugal flotation (designated in this article "D.C.F." method), which he recommends as being distinctly superior to any other method yet devised. In brief the method consists in (1) centrifuging a suspension of one gram of faeces in water; (2) mixing the sediment with about 18 c.c. of saturated salt solution and centrifuging again in a special tube with the surface of the fluid in contact with a cover-glass; (3) removing the cover-glass by a rapid upward pull in order to remove a large hanging drop; and (4) examining the drop by resting the cover by the corners on small plasticine cones on a slide drop-side down. The essential special apparatus consists of special centrifuge buckets provided with horns to prevent the cover-glass from slipping while centrifuging, special flat-bottomed tubes of appropriate size, and cover-glasses 0.5 mm. thick. There are a number of details which contribute to the success of the method, for which Lane's original papers should be consulted by anyone who is interested.

Lane bases his claims for the superiority of his method on two points:—(1) The fact that a larger proportion of the total number of eggs in a 1-gram sample of faeces can be brought to light quicker than by any other method, hence greater accuracy in the diagnosis of light infections; and (2) a very great saving in time and of eye strain on the part of the microscopist, since the area of examination is greatly reduced and the concentration of eggs is such that in most positive stools one glance in the microscope is sufficient to establish the diagnosis. Lane has also called attention to unexpected inaccuracies in the Stoll egg-counting technique for estimating the degree of infection by egg output, using direct centrifugal flotation as a control. In our laboratory we have been using a modification of Stoll's technique for making egg-counts, which we believe to be considerably more accurate than Stoll's method and to be reliable in giving a reasonably accurate indication of the egg output of an individual. It was of considerable interest, therefore, to test our egg-counting method against the D.C.F. method pushed to finality, i.e., repeated until no more eggs could be obtained, as a control, and also to compare the number of eggs obtained

from a single spin of the centrifuge in the D.C.F. method with the number of eggs obtained on a slide by the Kofoid and Barber (1918) technique which we had been using previously in our laboratory, and by the Willis (1921) method which is very popular elsewhere. It is necessary to state briefly the details of the technique we used in the case of each of the methods we compared.

Our test of the D.C.F. method, in the absence of apparatus which conforms exactly to Lane's recommendations, was not made under optimum conditions, and there is little doubt but that when the correct apparatus is obtained still better results can be expected as regards the percentage of eggs brought up by a single spin of the centrifuge. With the centrifuge available—in the absence of a tachometer for measuring its speed—we are not sure that the optimum speed for bringing up the maximum number of eggs and the minimum amount of debris has been obtained. Moreover, we have used tubes having an inside diameter of 10 mm. instead of 12.5 to 14 mm. and in consequence got a concentration of the suspension about 50 per cent. greater than that recommended by Lane as the optimum. For these reasons there has been more camouflage in some of the preparations than there should have been and a lower percentage of eggs obtained in the first spin.

Until we adopted the D.C.F. method for diagnosis, the Kofoid and Barber method of salt flotation and surface looping was the method which we considered the most effective and least troublesome, and we have used it with very satisfactory results. We have had no difficulty in diagnosing most positive stools within a few seconds of examination of the slide. For comparing this method with the D.C.F. method we made no special effort to get the best possible results but only such results as can be expected in routine work when the preparation of the slides is left in the hands of an assistant. The receptacles we use are small glass tumblers of about 35 to 40 c.c. capacity, 2.5 cm. in diameter at the bottom and 4 cm. at the top, and 5 cm. in depth. Approximately 1 gram of stool, estimated without weighing or measuring, is placed in the tumbler and is thoroughly mixed with saturated salt solution, a little at a time; the glass is then filled nearly to the top with the salt solution and the coarse floating material is forced below the surface by a thin disc of No. 9 steel wool. After an hour the surface film is looped off with a coarse iron-wire loop and the loopsful of fluid placed between grease-pencil marks on a 1-in. by 3-in. slide and examined. About 20 dips of the loop are required to cover the surface. We have found that better results are obtained by using a small quantity of stool and thoroughly mixing it with the salt solution than when a larger quantity is used and incompletely comminuted, since in the latter case the steel wool screen becomes clogged and does not permit the free passage of eggs to the surface. The table attached shows that,

although a sufficient number of eggs are obtained by this method to make a positive diagnosis easy in most cases, the percentage of the total number of eggs which is obtained in this manner is surprisingly small and frequently falls under 10 per cent.

Many workers have selected the somewhat simpler Willis method for diagnosis. Lane compared the results obtained by this method with the results by his D.C.F. method and found it unexpectedly inaccurate. A similar comparison has been made here. For the Willis method we used $\frac{1}{4}$ -oz. faeces tins having a depth of 9 mm. and a diameter of 32 mm. About $\frac{1}{2}$ gram of faeces was thoroughly stirred up with saturated salt solution, a little at a time, until the container was full. A 2-in. by 3-in. slide was then rested on the surface of the fluid, more fluid being added until the entire surface was in contact with the glass. The slide was left for from 15 to 20 minutes and then removed by a rapid upward lift and examined. The results obtained were strikingly irregular. In a few instances considerably more numerous eggs were obtained from $\frac{1}{2}$ gram of faeces in this way than from 1 gram by the Kofoid and Barber method, but in the great majority of cases fewer eggs have been obtained, in some instances only about 10 per cent. However, in only two cases of very light infections, where the total counts by the D.C.F. method were 8 and 4 respectively, did the Willis method give negative results when the Kofoid and Barber method was positive. The larger number of eggs and smaller quantity of debris which is ordinarily obtained by the Kofoid and Barber method indicates it as undoubtedly the better of the two.

In comparing the results of these two methods as compared with the D.C.F. method, as set out in the following table, it should be borne in mind that by the Kofoid and Barber technique the eggs are scattered over an area of about 1,000 sq. mm., by the Willis method over about 800 to 1,000 sq. mm., and by the D.C.F. method over an area of only about 100 sq. mm. Even this does not give a true picture of the comparative concentration of eggs by these methods, since, as Lane has shown, by slight manipulation most of the eggs on a cover-glass prepared by the D.C.F. method can be herded to near the centre of the drop and the concentration there becomes several times greater. In other words, with an equal number of eggs obtained by these two methods the concentration of the eggs is at least twenty times greater by the D.C.F. method. Furthermore, almost without exception, the number of eggs brought to light by a single spin in the D.C.F. method was greater than the number collected by the Kofoid and Barber method. The advantages of this greater concentration in very light infections are obvious, but, in my experience, in all cases which have as many as 400 or 500 eggs per gram the diagnosis can be made very rapidly by the Kofoid and Barber method, often

by a single glance in the microscope. In this case there is no real advantage in the greater concentration of the eggs. It is in the case of negative stools that time and energy are saved, for here the saving in area to be examined is fully effective, and ten negatives can be passed by the D.C.F. method while one is being passed by the Kofoid and Barber method.

The striking difference in the results obtained by the D.C.F. method from different stools is interesting. In some instances, even without the optimum conditions, over 90 per cent. of all the eggs were obtained on the first spin, whereas in other cases less than 20 per cent. were recovered by the first spin under exactly similar conditions. No. 36 was especially peculiar in that eight spins were necessary to recover 160 eggs, the numbers obtained on each spin being as follows:—31, 33, 21, 34, 15, 11, 11, and 4; the pour-off was negative. It is also peculiar that the Kofoid and Barber method produced only 12 eggs from this stool, whereas the Willis method produced 56. It was surprising to find that in some light cases the total number of eggs recoverable was less than 5, and in some cases only 1. From case 16, for instance, we could obtain only 1 egg from a gram of stool on two different occasions, and on another occasion it was entirely negative. These stools were uniformly negative by all the other methods. Lane comes to the conclusion that 28 to 30 eggs per gram is the usual number which can be expected from a single normally ovipositing female hookworm, and this agrees with the findings of ourselves and others, but it is evident that the females do not always oviposit at the normal rate.

Assuming that the number of eggs recovered by the D.C.F. method from a gram of faeces by repeated centrifugal spins and examination of the pour-off (see *Trans. Roy. Soc. Trop. Med. & Hyg.*, 1924, Vol. 7, pp. 415-416), represents very nearly the total number of eggs present,—a conclusion which seems to be justifiable in the light of checks and controls made by Lane,—a comparison of this total with the estimate obtained by our modification of Stoll's egg-counting technique is of great interest. This technique was described in full elsewhere (Chandler, 1925); in brief it is as follows:—three grams of stool are thoroughly comminuted in 90 c.c. of N/10 sodium hydroxide in a small flask and two 0.3 c.c. samples are examined on uncovered slides; the average of the two egg-counts multiplied by 100 gives the estimated number of eggs per gram. Stoll's original technique consists in mixing 3 grams of stool with 45 c.c. of N/10 sodium hydroxide and the counting of eggs in a 0.15 c.c. sample of this on a covered slide. The opportunities for loss of eggs by camouflage are much greater in this than in our method. Lane got surprisingly uneven results from his modification of Stoll's method which he used as a control for his D.C.F. counts. Maplestone (1924) also reports unfavourably on this method, showing that there is

much camouflage of eggs. By using twice the quantity and double the dilution used by Stoll and examining for eggs on an uncovered slide on which the debris can be gently blown aside to expose eggs lying underneath, we felt confident that no appreciable number of eggs was being lost by camouflage. We averaged two counts from separately prepared suspensions from

different parts of a stirred stool in order to avoid errors due to sampling, but where the degree of infection in groups is being investigated these errors balance themselves and reasonably accurate estimates can be obtained from single counts on each stool sample.

The comparison with the D.C.F. totals shows that in almost every instance the egg-counts

TABLE I.

| No. | Case. | Nature of stool. | D. C. F. | | STOLL EGG-COUNTS. | | | K. & B. | Willis. |
|-----|-------|------------------|-----------|---------|-------------------|------------|------------|---------|---------|
| | | | 1st spin. | Total. | Estimated eggs. | 1st slide. | 2nd slide. | | |
| 1 | K10 | L. | ** | 14,270 | 11,800 | 123 | 113 | .... | .... |
| 2 | K10 | M. | ** | 21,122 | 23,850 | 249 | 238 | .... | .... |
| 3 | K15 | L. | 1 | 1 | .... | 0 | 0 | .... | .... |
| 4 | K15 | L. | 26 | 34 | 100 | 2 | 0 | .... | .... |
| 5 | K7 | M. | 332 | 357 | 950 | 8 | 11 | .... | .... |
| 6 | K7 | M. | (392)* | (413)* | 750 | 6 | 9 | .... | .... |
| 7 | D6 | M. | 22 | 49 | .... | 0 | 0 | .... | .... |
| 8 | D6 | S.L. | 24 | 42 | 150 | 2 | 1 | .... | .... |
| 9 | D6 | S.L. | 65 | 74 | 150 | 1 | 2 | .... | .... |
| 10 | K16 | L. | 3 | 12 | 50 | 0 | 1 | .... | .... |
| 11 | K16 | S.L. | 39 | 60 | 50 | 0 | 1 | .... | .... |
| 12 | K5 | L. | 103 | 126 | 100 | 1 | 1 | .... | .... |
| 13 | K5 | L. | 50 | 75 | 50 | 0 | 1 | .... | .... |
| 14 | K5 | S.L. | 76 | 133 | 100 | 1 | 1 | .... | .... |
| 15 | K18 | S.L. | 156 | 488 | 650 | 6 | 7 | .... | .... |
| 16 | K18 | L. | 136 | 181 | 150 | 2 | 1 | .... | .... |
| 17 | K18 | S.L. | (213)* | (242)* | 550 | 5 | 6 | .... | .... |
| 18 | K4 | L. | 63 | 71 | 50 | 1 | 0 | .... | .... |
| 19 | K1 | S.L. | 167 | 178 | 200 | 3 | 1 | .... | .... |
| 20 | D11 | M. | 6 | 12 | 50 | 0 | 1 | .... | .... |
| 21 | D2 | M. | 108 | 158 | 200 | 2 | 2 | .... | .... |
| 22 | H3 | M. | 9 | 49 | 50 | 0 | 1 | .... | .... |
| 23 | H3 | M. | 24 | 46 | 50 | 0 | 1 | .... | .... |
| 24 | D2 | M. | 130 | 162 | 200 | 2 | 2 | 12 | 3 |
| 25 | K16 | L. | 27 | 54 | 50 | 1 | 0 | 42 | 38 |
| 26 | K2 | S.L. | 112 | 128 | 100 | 1 | 1 | 10 | 6 |
| 27 | K4 | S.L. | 184 | 328 | 250 | 3 | 2 | 34 | 25 |
| 28 | D16 | S.F. | (197)* | (618)* | 1,600 | 14 | 18 | 72 | 70 |
| 29 | F16 | M. | (458)* | 1,236 | 1,350 | 16 | 11 | 226 | 132 |
| 30 | F16 | S.F. | (579)* | (838)* | 2,100 | 21 | 21 | 227 | 100 |
| 31 | K18 | S.L. | 6 | 12 | 1,966 | 9 | 9 | 375 | 188 |
| 32 | D18 | S.L. | 121 | 413 | 350 | 3 | 4 | 60 | 3 |
| 33 | D18 | M. | (332)* | (500)* | 900 | 9 | 9 | 112 | 34 |
| 34 | H2 | F. | 368 | 438 | 400 | 5 | 3 | 12 | 8 |
| 35 | P2 | L. | 17 | 105 | 200 | 2 | 2 | 18 | 13 |
| 36 | P9 | M. | 31 | 160 | 150 | 2 | 1 | 12 | 56 |
| 37 | P16 | S.F. | 23 | 127 | 100 | 1 | 1 | 5 | 10 |
| 38 | P9 | S.F. | 253 | 445 | 350 | 3 | 4 | 58 | 12 |
| 39 | P16 | M. | 123 | 186 | 200 | 2 | 2 | 17 | 3 |
| 40 | K5 | M. | (220)* | (324)* | 500 | 5 | 5 | 40 | 48 |
| 41 | K5 | M. | 148 | 360 | 350 | 4 | 3 | 33 | 31 |
| 42 | K5 | M. | 109 | 299 | 250 | 3 | 2 | 11 | 24 |
| 43 | P16 | L. | 0 | 8 | .... | 0 | 0 | 2 | 0 |
| 44 | P16 | L. | 1 | 4 | .... | 0 | 0 | 1 | 0 |
| 45 | P16 | L. | 14 | 20 | 50 | 0 | 0 | 4 | 1 |
| 46 | P5 | M. | ** | 2,718 | 2,800 | 25 | 31 | 716 | 71 |
| 47 | H16 | S.F. | 2 | 2 | .... | 0 | 0 | 0 | 0 |
| 48 | H16 | M. | 0 | 1 | .... | 0 | 0 | 0 | 0 |
| 49 | H16 | M. | 0 | 1 | .... | 0 | 0 | 0 | 0 |
| 50 | P5 | M. | ** | (2,214) | 4,200 | 36 | 48 | 370 | 35 |
| | | | | 4,428 | | | | | |

L.=liquid; S.L.=semi-liquid; M.=mushy; S.F.=semi-formed; F.=formed.
 * =Due to large number of eggs involved; only $\frac{1}{2}$ gram of stool was used for the suspension. The number for 1 gram based on the counts for $\frac{1}{2}$ gram are given underneath.

** =Due to very large number of eggs involved; the eggs recovered on first two or three spins were washed into a measured quantity of water, thoroughly stirred, and the number estimated from the average count of two samples. The number obtained on subsequent spins was added to this.

check with astonishing accuracy, in most of the low counts falling within the nearest 50 and in the higher counts the nearest 100. The only striking discrepancy in the whole series is in stool No. 5, in which the dilution counts indicated 950 eggs per gram and only 357 were obtained by the D.C.F. method. In this case, however, much debris floated up in the salt solution and probably interfered with the recovery of the eggs. The average number of eggs per person for the entire group, based on the totals obtained by the D. C. F. method, comes to 1,112, whereas based on the egg-count estimates it comes to 1,132, which is far closer than one might reasonably have expected from an egg-counting technique in which the eggs in only 1/100th of a gram are counted.

The substitution of the D.C.F. method for the Stoll egg-counting method for estimating egg output seems to us quite impracticable. Even assuming that with every detail of the technique carefully controlled 90 per cent. or more of the total eggs can be obtained on a single spin, when this number exceeds one or two hundred, which is more frequently the case than otherwise, the counting of the eggs is very burdensome; and when the eggs exceed five or six hundred an accurate count becomes quite impossible without spreading the drop over a large area or washing the eggs into a measured quantity of fluid and counting the number in a measured fraction, either of which involves time and labour. The results from our egg-counting technique indicate that it is fully as accurate as the D.C.F. method—even when the latter is pushed to finality—and it is certainly less troublesome, in that a single process is suitable for all degrees of infection. Where less than 100 eggs per gram are present only one or no eggs can be expected on two slides. If there is one egg on two slides an average of 50 is indicated, whereas two negative slides from a stool which has been shown to be positive by a concentrative technique can arbitrarily be regarded as having 25 eggs per gram without involving any great inaccuracy in a group estimate.

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THE TOXICITY OF CARBON TETRACHLORIDE TO CATS. A WARNING

By ASA C. CHANDLER, M.S., Ph.D.,

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and

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MAJOR, I.M.S.,

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ON account of conditions which made it difficult to keep dogs under observation for experimental work we attempted to use cats for a number of experiments on the toxicity of carbon tetrachloride under various conditions of diet, etc. In all we have given carbon tetrachloride to 87 cats, in various dosages and under various dietary conditions and have found the susceptibility of cats to this drug so great that it was impossible to get more than suggestive results from our various experiments. Ninety-two per cent. of the cats died or were killed in a dying condition, regardless of dosage or diet.

Hall and Shillinger (1923) state that carbon tetrachloride at the rate of 0.3 c.c. per kilo. is well tolerated by cats, and report ten experiments on five kittens, with doses of carbon tetrachloride ranging from 2 c.c. to over 11 c.c. per kilo., of which only two, receiving over 9 c.c. per kilo. each, died. Two of the kittens were treated three times, some of the doses being as high as 7 and 8 c.c. per kilo. These authors also report a statement by Dr. O. V. Brumley of the Ohio State University that "it (carbon tetrachloride) has been a great help, particularly in the treatment of hookworms in dogs and cats," and they record Dr. Buckingham of Washington as reporting favourably on the use of carbon tetrachloride, in cats. Hall and Shillinger conclude that, in so far as conclusions can safely be drawn from their experiments, carbon tetrachloride has a wide margin of safety for cats, between the therapeutic dosage of 0.3 c.c. per kilo. and the minimum lethal dose, and that members of the Felidae as well as the Canidae are highly tolerant to the drug.

Relying on these conclusions we selected 0.5 c.c. per kilo. as an experimental dosage, thinking that this would probably produce sufficient damage in unprotected animals so that an improvement could be noticed readily if we were successful in protecting the animals against the effects of the drug. The carbon tetrachloride we used is the same as that used in our hospital for human cases, is free from carbon bisulphide and phosgene, and conforms to the other usual standards of purity for carbon tetrachloride.

As a preliminary we administered 0.5 c.c. per kilo. to six full-grown cats (1,600 to 3,000 grams) by stomach tube about three hours after food. Of these six, three died on the

second day, two more on the third day, and the last one, which was dying, was killed on the same day. This result was so much at variance with what we had expected from Hall and Shillinger's results that we repeated the experiment using kittens weighing from 670 to 940 grams, similar to those used by Hall and Shillinger. Of these six, two died on the second day, two died on the third day, one which was in a dying condition was killed on the same day, and the sixth one died on the fourth day. In another batch of full-grown cats, one died on the day following treatment, and all the other five died on the second day. It is needless to go into detail here regarding the attempts at protection against the effect of carbon tetrachloride which we tried, since these will be fully discussed in another paper. Suffice it to say that nothing we tried in the way of diet, purging, or other preparation succeeded in saving more than two out of six cats, and this only in one instance; the best we could do in most cases was to delay death to the third and fourth days instead of the second and third days. In four cases death occurred on the fifth day, and in three instances the cats did not die until the sixth, eighth, and eleventh days respectively. Of 49 cats which were given 0.5 c.c. per kilo., only 4 survived; of 27 which were given 0.25 c.c. per kilo., 3 survived; and of 12 given 4 c.c. per kilo., all died. We had no difficulty with vomiting in the case of the smaller doses, but ten of the twelve which were given 4 c.c. vomited within about half an hour. Altogether, 8 cats out of the 87 died on the day following treatment, 30 on the second day, 23 on the third day, 7 on the fourth day, and 4 on the fifth day; 5 were killed when in a dying condition, and 7 survived. Four of the eight which died on the day following treatment had vomited, from which we deduce that very likely death was hastened by inhalation of carbon tetrachloride from the vomitus.

We cut sections of the liver and kidney of all these cats, and sections of the spleen, suprarenal, and intestinal wall of many of them. We found no significant changes in the spleen, and in only a few instances we found slight damage of the outer cortical cells of the suprarenals, which was quite in contrast with the necrosis reported by Phelps and Hu (1924). The intestinal wall in some instances showed the villi severely congested and occasionally denuded of the epithelium. The really important lesions were found in the liver and kidneys. The liver in every instance showed the central necrosis which is so characteristic of carbon tetrachloride, and usually a very extensive fatty degeneration was present. From 25 to practically 100 per cent. of the liver tissue was damaged even in cats which received only 0.25 c.c. per kilo. Most remarkable, however, were the lesions found in the

kidneys, and in many if not most instances we believe that the renal rather than the hepatic damage was the actual cause of death, and that the susceptibility of this organ in cats accounts for the much greater toxicity of carbon tetrachloride for cats than for dogs. The convoluted tubules show extensive fatty degeneration and frequently necrosis, but the collecting tubules are as a rule little affected; there is often desquamation—sometimes very extensive—of Henle's loops. The Bowman capsules are frequently infiltrated with blood, and the glomerular endothelium is swollen and the vessels dilated. In every instance in which we were able to obtain urine at autopsy there was albumen present, often in great quantity, and there was frequent evidence of blood.

We are quite at a loss to account for the striking differences between our results and those of Hall and Shillinger, but we are convinced that it is very unsafe to attempt the treatment of feline animals with carbon tetrachloride and therefore give warning against its use.

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"DIAGNOSIS" IN HOSPITALS.

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BEFORE discussing the question of "diagnosis" in hospitals it will be advisable to make a few remarks about the grouping of patients, which appears in several places of this paper. With a view to the preparation of accurate statistics it has been found that all the patients of some hospitals, owing to local conditions, cannot be counted together. Therefore to overcome this difficulty different groups have had to be formed so that each patient either on admission into hospital or as soon as possible after admission, that is on the case being diagnosed, must be placed in one of these groups; and the patients of each group will be enumerated in that group and not with the patients in the other groups.

The groups vary according to local conditions but some of them are:—

1. Ordinary:—Most of the patients are in this group.
2. Transfer:—Patients received as transfers from other hospitals and to prevent them from being enumerated more than once.
3. No appreciable disease:—Patients with no disease and to prevent them from being enumerated with those with a disease.

4. Pregnancy:—These patients are admitted to await their confinement and during this period are shown in this group.

5. Etc., etc., etc., etc., etc., etc.

For brevity, diseases and injuries, except in a few instances, will be mentioned as diseases.

It is absolutely essential that all diseases must be diagnosed according to some definite method, otherwise it is quite impossible for statistics to be compiled with any accuracy.

The authorities of the majority, if not all hospitals and dispensaries, diagnose the diseases of their patients in accordance with "The Nomenclature of Diseases," published by the College of Physicians, London. The authorities of the military hospitals in India diagnose the diseases of their patients not only in accordance with "The Nomenclature of Diseases," but also certain diseases of their patients in accordance with special lists published, from time to time, in "Army Instructions, India," and not in accordance with "The Nomenclature of Diseases."

It is hoped that when another edition of "The Nomenclature of Diseases" is to be published the special lists of diseases published by the military medical authorities will be considered with a view to being embodied in it.

It is a pity that the serial number of the diseases in "The Nomenclature of Diseases" has been done away with in the 1918 edition, as these numbers used to facilitate greatly the work of finding and of checking the various diseases. The usefulness of these numbers was by many not realised till they began to diagnose the diseases with the 1918 edition of "The Nomenclature of Diseases"—that is, when the serial number of the diseases had been done away with. These numbers, if they had not been done away with, would have been very useful, if used only (and not the name of the disease) for showing the patient's disease on his or her case card, which is hung in the ward, and also in the register of the patients, till the auditors had finished auditing the books, when the name of the disease could be entered.

The reader's attention is drawn to the following in the 1918 edition of "The Nomenclature of Diseases":—

(a) Memorandum by sub-committee on classification on p. 10.

(b) The footnotes on the pages.

(c) The diseases themselves. The author recommends that no diseases should be diagnosed till the instructions about that disease in "The Nomenclature of Diseases" have been considered.

As an example let us consider the diagnosis of "small-pox." Besides diagnosing the case as "small-pox" we have to state additional information as seen from the following extract from "The Nomenclature of Diseases" regarding "small-pox":—

"Small-pox. Synonym, variola."

In every case the presence or absence of marks of vaccination, and when marks are present, their

number, size and character should be noted. Any reliable information should be added as to whether the patient was unvaccinated; vaccinated in infancy only; vaccinated after infancy (state age if known); vaccinated only after infection with small-pox; or revaccinated (give dates if known).

If possible the diagnosis should be made in accordance with the cause of the disease and the pathological or local condition should also be specified. In the case of one or more organs or localities being principally affected it should be stated.

The pathological or local condition should be diagnosed only when all available means have failed to find the cause of the disease. The following few examples will explain the above statement:—

(a) Tubercle of the lungs should be diagnosed as "tubercle, lungs, etc." and not as "phthisis." The latter condition, as stated above, used to be diagnosed only when all means had failed to detect the tubercle bacillus. "Phthisis" no longer appears in "The Nomenclature of Diseases."

(b) Abortion. Cases of "abortion," say due to "syphilis" in most hospitals are diagnosed as "abortion" and not as "syphilis" and yet in the case-sheets or cards a remark about the patient suffering from "syphilis" will be found. The abortion in these cases is really a sign or symptom just as much as vomiting and purging are in the case of cholera. The latter are diagnosed not as vomiting and purging but as "cholera" and so the former should be diagnosed not as "abortion" but as "syphilis." Under the present rules and registers of patients a remark about the abortion should be made in the "remarks" column.

(c) Cases of enlarged spleen due to, say, malaria or kala-azar are diagnosed, not as "enlarged spleen," but as "malarial cachexia" or "kala-azar" as the case may be. "Enlarged spleen" is diagnosed as such only after failure to trace the cause of it.

(d) Pyrexia of uncertain origin (P.U.O.) should not be diagnosed as such till all the most recent available methods of examination have failed to reveal the cause of the pyrexia from which the patient is suffering.

Injuries.—In all cases of injuries state:—

1. Whether (a) self inflicted; (b) judicial; (c) homicidal; or (d) received in battle.

2. Mechanism or agent causing injury.

3. (a) Chief injury caused in 1 (a), 1 (b) and 1 (c). The additional injuries, if any, to be entered in the "remarks" column.

(b) The injuries caused in 1 (d). All wounds and injuries received in action should be diagnosed in accordance with the instructions on the fly-leaf of the admission and discharge book (A.B. 27a). The remarks made below under two or more diseases or diseases and injuries do not preclude a full entry being made of all wounds and injuries received in action.

Example:—

- (1) I (4) G.S.W. Head; penetrating cranium.
- (2) IV (2) G.S.W. Chest; fractures 4th rib, right.
(G.S.W. = Gunshot wound).

Wound.—Incised Umbilical Cord.—There is no uniformity in maternity hospitals about showing newborn infants as patients of the hospital. One of the following procedures is usually adopted:—

(a) They are not shown as patients till they develop some illness from which they are likely to die.

(b) Those developing an illness are shown and those not developing an illness are not shown as patients.

(c) All are shown as patients either for some illness from which they are suffering or for "umbilical dressing."

This shows that the statistics of these hospitals are incomparable.

This defect should be remedied and so the author suggests that all newborn infants in a hospital should be shown as patients of that hospital by admitting them either for an illness from which they are suffering or for some condition which should be decided by a central committee.

All newborn infants require dressings for the umbilical cord but this is not shown as a disease in "The Nomenclature of Diseases" and so these cases of healthy newborn infants cannot correctly be returned as "umbilical dressing."

The author is of the opinion that pending the decision of the central committee these cases should be admitted for "wound—incised umbilical cord." This condition is in keeping with the requirements of "The Nomenclature of Diseases."

It may be argued that the admitting of healthy newborn infants as patients of a hospital is merely to swell the numbers of the patients with the object of showing a larger number of occupied beds for financial purposes. This argument is absurd as all newborn infants whether they are suffering from a disease or not have to be supplied with a crib, bedding, clothing, medicine, dressings, perhaps diet and also have to be bathed and looked after and so they entail expenditure under several budget heads, which can legitimately only be met by showing them as patients. If they are not shown as patients then how is this expenditure on their account to be met?

Debility.—This is a very common diagnosis and formerly orders were issued to the effect that this term should only be used when the cause of the condition was not traceable. It is not mentioned in the 1918 edition of "The Nomenclature of Diseases" and so it is imperative that all persons suffering from so-called "debility" must be diagnosed under its cause. In the past a common method of getting over this difficulty was to diagnose these cases as "anæmia" and this no doubt will be the procedure adopted in the future. So statisticians look out for this!

It is regretted that a large number of the diseases in "The Nomenclature of Diseases" are not diagnosed in accordance with the rule that diseases should be diagnosed under their "causes" and the local or pathological condition produced should also be specified. Let us take the following example with the object of explaining this statement:—

Syphilis in the primary and secondary stages is diagnosed as such, and in the tertiary stage it is diagnosed, not as "syphilis," but in accordance with the pathological condition produced, such as, say, "locomotor ataxia." This latter diagnosis is quite legitimate when the cause of the pathological condition is neither known nor found in the patient, but it is unscientific to diagnose a case in accordance with the pathological condition produced and not in keeping with the cause of the condition. During the last few years venereal diseases have come to the front a great deal, and we frequently read all kinds of statistical figures in support of adopting some measure. The question arises "Can any reliance be placed on these statistical figures when a large percentage of the syphilitic cases in the tertiary stage, as stated above, are diagnosed, not as syphilis, but as the pathological condition produced?"

The author is of the opinion that a very large number of these syphilitic cases are not included in the statistical figures of syphilis.

This raises the question of the terminology of the cause of many well-known diseases. The diagnosis of "syphilis" for the primary and secondary stages is of old standing, but the author is of the opinion that we should be in keeping with modern knowledge and diagnose it, in all the three stages, as regards the cause, not as "syphilis," but as "*Spirochæta pallida* disease."

This principle should be adopted all through the science of diagnosis.

As regards the pathological changes produced in the tissues by the disease sufficient attention is not paid from a statistical point of view, although the diagnosis of these changes is noted very fully in the case papers of the patient concerned. The author suggests that these changes should be noted fully in the diagnosis of the cases and entered in the register of patients. To explain this statement let us take the case of "gonorrhœa" in the male. From a statistical point of view it is quite sufficient to enter this case in the register of the patients as "gonorrhœa," and in a few exceptional cases, such as the eye, nothing is mentioned about the tissues affected or the extent to which they are affected. The latter from a treatment and prognosis point of view is very important, and so it is diagnosed in the case papers of the patient, but no record is kept in the register of patients. Consequently this information is not included in the statistics of the hospital. Suppose a big percentage of the gonorrhœa cases are discharged from the hospital as "otherwise relieved" or

"incurable" and so the natural question which will be raised is "Why is this the case?" The answer will be found, not in the register of patients, but in the case papers of the patients, and to look up these papers will entail many days or even weeks of hard work. If the diagnosis of the tissues involved and the extent to which they were involved were entered in the register of patients it would facilitate greatly the answer to many of the questions which arise, and further make the statistics of the hospital more interesting. Now in the case of gonorrhoea in the male, besides diagnosing "gonorrhoea," we should state whether the condition is acute or chronic, the tissues involved, and the extent to which involved, such as anterior urethra, posterior urethra, or both; surface or deeper tissue affection; and complications such as vesiculitis, epididymitis, orchitis, prostatitis, rheumatism, etc.

Again the term "gonorrhoeal rheumatism" is used in a very vague sense. The question is "What does rheumatism mean?" The answer, on looking up books, is that it is an affection of joints, heart and its membranes, or both. Some books include "chorea" under rheumatism. In "The Nomenclature of Diseases" rheumatism is diagnosed under "rheumatic fever."

From the above it will be seen readily that there are many difficulties in diagnosing diseases, but it is hoped that with our advancing knowledge of the causes of, and of the pathological changes produced in the tissues by diseases it will not be long before we are in a position to decide on some sound scientific principles for the diagnosing of all diseases.

In the meantime the author is of the opinion that all diseases should be diagnosed, as far as practicable, in accordance with the cause of the disease as well as with the pathological condition produced. This, if approved, will necessitate the "diagnosis" column in the register of patients to be sub-divided into the following two sub-columns:—

(1) *Cause of disease.*—In many diseases we know the pathological condition produced, but we are unable to state the cause of it, and so this sub-column in these cases must be shown as "?".

(2) *Pathological condition produced.*—In several conditions we may know the cause of the disease, but owing to our limited knowledge, we are unable to state the pathological condition produced, and so it is essential to state the important sign or symptom present, such as jaundice, melancholia, mania, etc.

The question of the diagnosis of disease, owing to the present system, must be considered from a scientific as well as from a statistical point of view.

Many medical officers diagnose the diseases scientifically, and where necessary fit them into those mentioned in "The Nomenclature of Diseases"; while others diagnose the diseases according to "The Nomenclature of Diseases"

and quite ignore the scientific diagnosis. Hence, till "The Nomenclature of Diseases" meets these requirements, it is suggested that the "diagnosis" or "disease" column of the register of patients should be divided into "statistical" and "scientific" columns. The necessity for this can be more fully explained by taking the following examples:—

Cases of "typhoid," "paratyphoid A" and "paratyphoid B," although scientifically separate diseases, were shown as "enteric" in the 1906 edition of "The Nomenclature of Diseases." That is, statistically they were considered one disease. The 1918 edition of "The Nomenclature of Diseases" shows them as:—

(a) Typhoid fever.

(b) Paratyphoid fever.

In the military department in India "enteric" has been substituted by:—

(a) Typhoid fever.

(b) Paratyphoid "A" fever.

(c) Paratyphoid "B" fever.

The diagnosis of these three is based on the isolation of the specific organism.

(d) Enteric fever is diagnosed clinically or on a rising Gruber-Widal reaction and the organism is not isolated.

New Infections and Relapses.—Infective diseases like malaria and venereal diseases in the military medical department in India are further diagnosed as to whether they are "new infectious" or "relapses" as seen in the following:—

Malaria. (a) Quartan: new infection.

" : relapse

(b) Benign tertian: new infection.

" : relapse.

(c) Malignant tertian: new infection.

" : relapse.

(d) Malarial cachexia.

(e) Clinical: new infection.

" : relapse.

Syphilis. (a) Acquired: new infection.

" : relapse.

(b) Congenital.

Soft chancre: New infection.

Relapse.

Gonorrhoea: New infection.

Relapse.

Two or More Diseases.—Frequently patients suffer from two or more diseases, and it is quite absurd to show the one patient as two or more patients in accordance with the number of the diseases from which he or she is suffering. According to the rule the most important of the diseases from which a patient is suffering is diagnosed and entered in the "diagnosis" column of the register of patients. This, of course, does not mean that the other diseases from which a patient is suffering are not to be mentioned in the case-sheet or card, and the author further suggests that, although it has never been done as far as

he knows, the additional diseases should be entered in a special column of the admission and discharge card and of the register of patients, and additional disease cards for each of these additional diseases be made and kept separate from the cards of the diagnosed diseases. It is quite possible that later one of these additional diseases becomes more important than the diagnosed disease, of which the patient may be better or cured, and in this case the patient can be discharged from the entry in the register of patients by "new disease having supervened," and re-admitted in another entry in the register of patients by "new disease (one of the additional diseases) having supervened."

At present it is impossible to conjecture how valuable this recording of the additional diseases may be in the future, near or remote. It may be found that in some cases these additional diseases, along with the diagnosed disease, are perhaps only the signs or symptoms of some particular disease. It is very difficult to state whether signs and symptoms should also be entered in this column of additional diseases, and further, "What is a sign or symptom and what is a disease?" In this connection it is advisable to take an example, such as a patient suffering from "intestinal stasis and melancholia." The author has both heard and read good arguments in favour of the melancholia being secondary to the intestinal stasis, and also in favour of the intestinal stasis being secondary to the melancholia. The author is of the opinion that melancholia is nothing more than a symptom, and if the intestinal stasis is secondary to the melancholia, then the pathological condition, whether in the brain or elsewhere, or the cause of the pathological condition should be diagnosed. Our knowledge in these matters at present is very limited and hence the great difficulty. The day will arrive when these conditions will be diagnosed more definitely. Till then we must content ourselves by diagnosing some cases by the chief sign or symptom present. The medical attendant must use his or her discretion in diagnosing the case, and also in entering the additional important diseases, signs and symptoms in another column (additional diseases column) of the register of patients, as well as in the admission and discharge card, additional disease card, and in case papers or cards.

Women patients come to the ante-natal department of a hospital either to find out whether or not they are pregnant, or for advice about some condition which is either the result of the pregnancy, or of some disease which they have in addition to being pregnant. These cases will come under one of the following categories:—

(a) *Not pregnant and healthy women.*

These women are neither pregnant nor diseased, and so should be granted register numbers in the "no appreciable disease" group to prevent their

being enumerated amongst the patients who are suffering from a disease.

(b) *Not pregnant but suffering from some disease.*

These patients are suffering from a disease, and so should be diagnosed as such and granted a register number in the appropriate group.

(c) *Normal pregnancy in a healthy woman.*

Being a normal pregnancy, which is a physiological and not a pathological condition, there is no place in the usual returns of either a general or a special (ante-natal) hospital to show such cases. Consequently to get over this difficulty it is quite a common practice to diagnose these cases, not as "pregnancy," but as some slight sign or symptom of pregnancy, such as "vomiting" or "constipation," which the patient states she has. This is quite wrong, as it causes incorrect statistics. The remedy for this is to amend the return forms so as to show the cases of "pregnancy," but till this is done these cases of "pregnancy" should be shown in the returns against or under "no appreciable disease," and a remark made in the space for remarks to the effect that so many of these "no appreciable disease" cases are of "pregnancy." These cases in the register will be diagnosed as "pregnancy," and granted register numbers in the "pregnancy" group.

(d) *Aggravated form of one of the signs or symptoms of pregnancy, such as "vomiting," which requires treatment.*

These cases invariably are diagnosed as "vomiting," as they are under treatment for it and not for pregnancy. The author is of the opinion that this procedure is quite wrong. Just as vomiting is a symptom of "*Ascaris lumbricoides*" so vomiting—mild or severe—is a symptom of "pregnancy." The former is diagnosed as "*Ascaris lumbricoides*," and not as "vomiting," and so the latter should be diagnosed as "pregnancy" and not as "vomiting." These cases of pregnancy, as suggested in the pregnancy group of the register of patients, should be granted register numbers in the "pregnancy" group. Till the forms for submitting returns are amended, these "pregnancy" cases, as suggested in (c) above, should be shown against or under "no appreciable disease," and a remark made in the space for remark to the effect that so many of the "no appreciable disease" cases are of pregnancy, and so many of these pregnancy cases have vomiting.

(e) *Some disease, such as "nephritis," which is either due to or aggravated by pregnancy.*

These cases are either suffering from a disease or have a tendency towards that disease, and the pregnancy is only the exciting cause, and therefore these cases are correctly diagnosed as suffering from "disease." In the "remarks" column of

the present register of patients, or in the "additional diseases" column of the register suggested by the author, "pregnancy" should be entered.

Many held the view that albuminuria in pregnancy is due to pregnancy, and if the pregnancy was not there the patient would not have albuminuria or go on to eclampsia. If this view is correct, then pregnancy is a disease, and should be shown as such. These are debatable points and should be decided by experts on the subject.

(f) *Some disease, such as "syphilis," which exists along with the pregnancy.*

These cases are really under treatment for the disease (syphilis) and so should be shown as "syphilis" and granted a register number in the "venereal" group.

Now that ante-natal work has come to the front so much, it is hoped that experts will decide on a form for the submission of returns which will include all the above categories, but pending that, the author suggests that all return forms should have separate tables to account for respectively the following categories:—

- (1) Cases of "no appreciable disease."
- (2) Cases of disease (and not pregnant).
- (3) Cases of normal pregnancy.
- (4) Cases of pregnancy with one or more aggravated signs or symptoms of pregnancy.
- (5) Cases of disease aggravated by pregnancy.
- (6) Cases of disease co-existing with pregnancy.

Disease Supervened.

"Disease supervened" is a term used when a patient is discharged on paper—that is, from the entry in the register of patients for the disease from which he or she has been diagnosed as suffering,—and is re-admitted in another entry in the register of patients for the disease from which he or she is also suffering or has just developed, and which is more important than the previously diagnosed disease, and so it must necessarily be shown against the patient. The following examples will explain this:—

Frequently a patient recovers or greatly improves from the diagnosed disease, or one of the additional diseases from which he is suffering becomes worse to such an extent that it becomes more important than the diagnosed disease. In these cases the patient is discharged, on paper—that is, from the entry in the register for the disease for which he or she was originally admitted (diagnosed disease)—and re-admitted under another entry in the register as a new case for the disease which has become more important, and granted a fresh register number in the appropriate group; and in the "remarks" columns of the two entries the following remarks are respectively made:—"Discharged by new disease having

supervened, vide No. . . . and "admitted by new disease having supervened, vide No. . . ."

Again a patient is admitted into hospital for some particular disease and later he or she develops a second disease which is more important than the original disease and necessitates a fresh entry in the register. In this case the same procedure as that described above is adopted.

Confinement Supervened.

"Confinement supervened" is a term used in a similar way to "disease supervened."

Pregnant women are admitted into hospital for the conditions noted below, and are shown in the "diagnosis" column of the register of patients as noted against each:—

| Condition. | "Diagnosis" column. |
|---|---------------------|
| (a) Confinement | Pregnancy. |
| (b) Aggravated sign or symptom of pregnancy, such as "vomiting" | Pregnancy. |
| (c) Some disease which is either due to or aggravated by pregnancy, such as "nephritis" | Nephritis. |
| (d) Some disease which is quite independent of the pregnancy, such as "syphilis" | Syphilis. |

While these patients are in hospital labour pains begin, and so they are transferred to confinement wards. As confinement is a physiological, and not a pathological condition, these patients are dealt with in a manner similar to that in the case of "disease supervened"—that is, they are discharged from the entry in the register of patients for one of the above noted conditions for which they have been admitted, and re-admitted in another entry in the register of patients for "confinement," and granted a register number in the "confinement" group. In the "remarks" column of these two entries in the register of patients the following respective remarks should be made:—

"Discharged by confinement having supervened, vide No. . . ."

"Admitted by confinement having supervened, vide No. . . ."

In the event of the confinement case becoming abnormal, then treat her, as suggested above for "disease supervened,"—that is, discharge her from the entry in the register of patients for confinement by "new disease having supervened,"—and re-admit her in another entry in the register of patients for the abnormal confinement condition by "new disease having supervened," and grant her a register number in the "ordinary" group.

On the patient recovering from either the normal or the abnormal confinement (latter condition amounts to a disease) discharge her in the usual way.

In the event of the patient recovering from either the normal or the abnormal confinement,

but still suffering from either of the conditions mentioned above in (c) or (d), then deal with her as recommended for "disease supervened." that is, discharge her from the entry in the register of patients for the normal or the abnormal condition by "new disease having supervened," and re-admit her in another entry in the register of patients for the condition of (c) or (d) by "new disease having supervened."

In all the above transactions of "new disease and confinement having supervened" the appropriate columns of "condition on discharge" should be completed in accordance with the condition of the patient.

Disease or Confinement Supervened in a Case in one of the Transfer Groups.

In the event of a new disease or confinement having supervened in a case with a register number in one of the "transfer" groups, the register number for the re-admission—that is, for the new disease or confinement, must be in one of the appropriate groups for a direct admission and not in a transfer group. This case, as regards the re-admission, must be enumerated in the statistics of the hospital in which the disease or confinement supervened, while the admission in the "transfer" group, as explained under "transfer group," must be enumerated, not in the statistics of this hospital, but in those of the hospital which originally admitted the case, or in those of the original transferring hospital in the event of the case having been transferred from hospital to hospital more than once.

Results of Disease or Injury.

The results of a disease or injury should not be confused with a new disease supervening in a patient. For instance, a patient has been admitted for, say, fracture of the right humerus, and two or three weeks later he develops "wrist-drop." This "wrist-drop" is not a new disease but is the result of the fracture and therefore the patient must not be discharged and re-admitted on account of a so-called new disease "wrist-drop" or "musculo-spiral nerve paralysis" supervening but the patient must be continued to be shown for the fracture of the right humerus. (In passing, it may be stated that the particulars about fractures which have to be recorded will be found on p. 160 of the 1918 edition of "The Nomenclature of Diseases").

Disease Changed. (Error in Diagnosis).

"Disease changed" is a term used when a wrong diagnosis has been corrected.

It is advisable not to erase completely the wrong diagnosis, but to run a thin black line through it, so that it may be legible always. The idea of this is that if any reference is made in the future to account for the two diagnoses, this procedure will show at a glance that the erased diagnosis is wrong, and the diagnosis entered in

black above or below it is the correct one. If one or more returns have been submitted it is suggested that a red line be run through the wrong diagnosis, and the correct diagnosis entered in red ink, either above or below it, and further, that there be sent to the authorities concerned correction slips regarding the returns affected. A copy of the correction slips should be kept along with the corrected office copy of the return or returns thus affected. The erasure of the wrong diagnosis being with a red line and the entry of the correct diagnosis in red is to show that returns have been submitted with wrong diagnosis.

It may here be stated that on several occasions argument have occurred as to whether a diagnosis is to be changed or supervened. The author in these arguments has always taken the example of a case of chronic bronchitis, which later is found to be one of tuberculosis. The question arises as to whether the case was really a case of tuberculosis from the beginning or whether tuberculosis supervened on the bronchitis. If the former, the case is met by "disease changed," and if the latter, by "disease supervened." This cannot be decided by the registrar or his clerks, but must be decided by the physician in charge of the case, who is really the best judge. The diagnoses of all diseases are done by the physician or surgeon in charge of the respective cases, and so should this be.

Disease Changed in a Case in one of the Transfer Groups.

In the event of the disease of a case with a register number in one of the "transfer" groups being changed intimation to this effect should be sent to the hospital whence the case was received as a transfer, so that the records of that hospital can be corrected accordingly. The authorities of the latter hospital, if they have received the case from another hospital, should pass on the same intimation to that hospital for the same purpose. This intimation should be passed on in this way from hospital to hospital till it is received in the hospital where the patient in question was originally admitted—that is, where the patient was granted a register number, not in a "transfer" group, but in one of the appropriate groups usually granted to the original or direct admissions.

Observation for Some Infectious Disease.

It is quite a common practice for medical practitioners and others to report to the medical officer of health all suspicious cases of infectious diseases. These suspicious cases are, under the orders of the medical officer of health, admitted into an isolation hospital for observation for that particular infectious disease. For the convenience of explanation let us take as an example—"observation diphtheria."

The admission of this case into an isolation hospital is reported in the "daily state" by the medical superintendent of the isolation hospital to the medical officer of health.

One of the following two procedures is carried out in these observation cases:—

(1) If after some days this case is diagnosed as "diphtheria," then the patient is discharged from the entry in the register of patients for "observation diphtheria," and re-admitted in another entry in the register of patients for "diphtheria," as if he or she were a new patient, and the medical officer of health is informed of this paper transaction through the medium of the "daily state" of the isolation hospital, submitted by the medical superintendent.

(2) In the event of this case being diagnosed neither as "diphtheria" nor as any other infectious disease, then the entry in the records is continued as "observation diphtheria" as if it were a disease, and it is shown in all returns as "observation diphtheria."

It is said that the above methods have been adopted with a view to making the figures in the isolation hospital tally with those in the office of the medical officer of health.

The author is not only quite unable to see the reason for adopting the above methods, but is also of the opinion that they are faulty and unscientific.

The medical officer of health gets a "daily state" from the isolation hospital, and so his figures must tally with those of the isolation hospital.

The procedure under (1) above means that the one patient has been admitted into hospital for two diagnoses, and consequently becomes two patients, and also that the number of days in hospital for "observation diphtheria" is excluded from the number of days in hospital for "diphtheria," while really the patient during both the periods in hospital has been there for the one disease—"diphtheria."

In the returns the one patient is shown as two patients suffering respectively from "observation diphtheria" and "diphtheria." These above mentioned transactions have entailed additional clerical work.

The procedure under (2) above is quite wrong, as there is no such disease as "observation diphtheria." It is presumed that all these patients are suffering from some form of sore-throat and should be diagnosed as such.

It has been argued that medical officers of health and medical superintendents of isolation hospitals are prejudiced against showing non-infectious diseases in their records and returns, and so they show these cases as "observation for some infectious disease." This is taking a wrong view of the actual facts. In all isolation hospitals, during the course of a year quite a large number of the cases sent in by practitioners, diagnosed as suffering from some infectious disease, prove to be some non-infectious disease, and so these cases should be finally diagnosed, not as "observation for some infectious disease," but in accordance with "The Nomenclature of Diseases." These

cases, even if transferred to some general hospital for further treatment, must be accounted for during the days spent in the isolation hospital, and, from a statistical point of view, their exact disease should be diagnosed, as stated above, in accordance with "The Nomenclature of Diseases."

The author remembers a patient with a severe sore-throat in whose throat swabs no diphtheria bacilli were found, and so the case was diagnosed as "acute ulcerative tonsillitis." About two weeks after discharge from hospital the patient complained of food, especially fluids, regurgitating through the nostrils. This symptom was sufficient to diagnose the case as "diphtheria," and so the disease of this case was changed to "diphtheria," and the medical health authorities were informed of this change of diagnosis.

There are many diseases which take several days, if not weeks, to diagnose, and so the rule should be that only a pencil entry under "diagnosis" in the records regarding the most important sign or symptom (vide N.Y.D.) should be made, and when the diagnosis has definitely been made it should be entered in the records after erasure of the pencil entries.

No Appreciable Disease. (N.A.D.)

The diagnosis of the patients who on discharge from hospital are found not to be suffering from any disease is usually shown as "N.A.D.," which stands for "no appreciable disease."

Not Yet Diagnosed. (N.Y.D.)

With a view to enable the returns of the hospital to be submitted at the appointed time, it is found convenient to show all cases which have not been diagnosed as "N.Y.D.," which stands for "not yet diagnosed," and in the "remarks" column of the returns further notes should be made about each case, and in these notes the main signs or symptoms should be brought out, such as jaundice, fever, cough and fever, paralysis of one leg, etc., or it should be stated that the case is under observation for some particular disease. These cases, when diagnosed, should be shown either in the succeeding returns of the hospitals or in correction slips.

Diagnosis made in a "N.Y.D." Case in one of the Transfer Groups.

When a diagnosis is made in a "N.Y.D." case with a register number in one of the "transfer" groups, the procedure regarding the sending of an intimation as given under "disease changed in a case in one of the transfer groups" should be adopted.

Venereal Sore.

In many hospitals all the suspicious "venereal sores" instead of being shown temporarily as "N.Y.D.," as stated under "N.Y.D." above, are temporarily diagnosed in pencil as "V.S." (venereal sore) or as "N.Y.D., V.S." (not yet diagnosed, venereal sore). On one of these cases

being diagnosed definitely as "syphilis" or "soft chancre," the above temporary diagnosis in pencil is erased with india-rubber and in its stead the correct diagnosis is entered. In the returns appropriate remarks, as suggested under the system of "N.Y.D.," will have to be made. The author does not see the necessity for this procedure in preference to that of the "N.Y.D.," but he is merely bringing it to the notice of the reader as it is the custom of some hospitals.

Diagnosis made in a Venereal Sore or Not Yet Diagnosed Venereal Sore in one of the Transfer Groups.

When a diagnosis is made in a "venereal sore" (V.S.) or "not yet diagnosed venereal sore" (N.Y.D., V.S.) case with a register number in one of the "transfer" groups, the procedure as given under "disease changed in a case in one of the transfer groups" about sending an intimation should be adopted.

OBSERVATIONS ON CASES OF DEMENTIA PRÆCOX.

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SINCE Kraepelin recognised it as a distinct disease nearly thirty years ago, dementia præcox has been an interesting field for research and speculation among psychiatrists. Several controversial matters regarding it, e.g., whether it is a clinical entity or not, or whether it is physiogenic or psychogenic, are still unsettled. But controversy apart, on a close observation of cases, one finds several points of similarity to the symptoms described by Kraepelin and grouped together by him under the designation of dementia præcox.

A recognition of the early symptoms of this disease is of importance to the general practitioner, for though the term "dementia" applied to this disease would connote incurability yet there is a prospect of rehabilitating the patient and preventing permanent mental breakdown if the case is taken in hand early. Dementia præcox was not returned as a separate disease in the annual reports of mental hospitals until very recently, such cases being shown as mania or melancholia or "dementia of other forms" according to the prominent symptom observed in each case. The annual report of the Ranchi European Mental Hospital for 1921 shows 11 out of 49 admissions or 22.4 per cent. as cases of dementia præcox. In the Punjab hospital in 1921, 29 out of 345 or 8 per cent. were returned under this head. In the report of the mental hospitals in Bengal for the years 1921-23, out of a total of 213 admissions, 41 or 19 per cent. were for dementia præcox. In the annual reports of the Asylum, Bangalore (Mysore State) dementia præcox has not hitherto been shown in a separate column, but from the notes on cases it is found that nearly 30 per cent. of those admitted during 1923 were of the præcox type.

The disparity in the figures quoted above is explainable from the fact that there is great room for doubt as to what exactly constitutes dementia præcox. Professor Kraepelin himself admits that "the complexity of the conditions which we observe in the domain of dementia præcox is very great." But though in details these cases may differ, yet "dementia præcox on the whole represents a well characterised form of disease."

In the majority of cases there is a history of the patient having run away from his home and in his travels having come in collision with the law and thereby being recognised as insane for the first time. This impulsive act so characteristic of the disease leads later on to other irregularities of conduct which land the afflicted person into trouble and finally into the asylum. After leaving their homes these patients take to wandering at large without any aim. Generally they drift from the village into the city. Some join a travelling wedding party or a group of pilgrims to a shrine. Others wend their way with crowds of country folk towards the capital city for the annual festival. A few have been known to resort to a hill or a jungle, being discovered later on in a semi-starved condition.

This phase of vagabondage is often preceded by a display of intense dislike to the people of the house. "Strikes parents, ill-treats wife and children" or in the case of females "neglects household work, breaks pots and pans" is given as the early symptom in these cases.

On admission into the hospital most of these patients appear at first sight to be so placid and apparently so coherent in their replies to questions (though reticence is the rule with them) that they seem to belie the history usually accompanying them of wandering at large or molesting passers-by. Their memory is correct for all important events in their life, but their emotional instability is easily noticed in the senseless laughter or purposeless smile which accompanies their answer even to a serious question. Of course the patient denies the charge made against him of wandering at large. If he is asked the reason for leaving his home, he gives an apparently rational answer such as search for a job, visiting a large city or going to a festival.

Within a few days—or sometimes within the first 24 hours—of admission into the asylum he shows evidence of the true nature of his malady. He has either snatched another patient's food or of a morning he is found to have torn his clothes into rags or smeared himself and the walls of his room with faeces or has carefully bundled the excrement in a part of his garment. The reason for this is not forthcoming. When a maniacal patient in his stress of activity tears his clothes he has a reason ready to account for his act. He would say that he wished to convert one garment into two or that he wanted to renew it. But a præcox patient has no such answer

ready but a bare denial, with a purposeless smile. The combination of bizarre conduct with a clear consciousness and good apprehension of surroundings and perhaps good memory can only be regarded as a dissociation of mental structure in such a way that the dissociated portions regress to earlier levels of mental life. This disordered conduct persists for a considerable time until as a result of watchfulness or other treatment the patient may revert to his normal conduct and adapt himself satisfactorily.

Another set of cases display a "negativistic" impulse which takes the form of "mutism." The history in these cases is that the patient gradually became seclusive, indifferent to his usual work, reticent in conversation and finally quite mute, as in the following cases.

Case 1.—J. S., male, æt. 23, an army cook with the Waziristan Field Force, admitted on 14th July, 1923, in a state of absolute mutism with a facial expression of defiance and a tendency to be violent when interfered with. He was resistive and refused to comply with simple requests, such as asking him to show his tongue, to sit or stand up. He was in this state for 4 months prior to admission. He was given thyroid extract grs. v., *b.d.* for 9 days at the end of which he was not so resistive as before, showed more voluntary activity and responded readily by action. At this stage suggestion and persuasion were tried and a month and six days after admission he spoke to the hospital attendants, became cheerful, active in his habits and answered questions readily. He had a clear consciousness and correct memory of all events during his illness. After discharge from hospital he joined his old post.

Case 2.—N. B., female, æt. 20, admitted on 21st January, 1924. Speechless, holds her mouth tightly closed, remains in any position that she is placed in, had to be forcibly fed, and smiled occasionally without any reason. Her previous history was that she was hallucinated and incoherent for three months before admission and then became mute and resistive. Under suggestion her resistance to external stimuli was gradually overcome, her cataleptic rigidity disappeared and she began to walk about, accepted food readily, took interest in her surroundings, and indicated her wants in writing. Three months after admission she began to speak freely and was discharged from hospital. She is reported to be getting on well in her home.

A point of interest to general practitioners is that some of these cases in their incipient stages may be mistaken for hysteria or neurasthenia. It must be borne in mind that dementia præcox may supervene on a previous hysterical or neurasthenic state. A writer in a recent issue of the *Lancet* emphasises the importance of keeping the possibility of a psychosis in mind when a young adult is seen with neurasthenic or hysterical symptoms. The two cases recorded above would at first sight appear to be hysterical, but

unlike the hysteric, there was a definite air of unconcernedness to environment with a marked negativistic tendency in each of these patients.

In this connection it may not be inappropriate to allude to a tendency prevalent among the public—and shared in by some medical practitioners—of dubbing any case of disordered conduct as hysterics, especially if it happens to be in a female, even when definitely insane symptoms are manifested. It is needless to point out the danger of glossing over a serious disease by calling it simply hysterics and treating it as such. It may be consoling to the relatives to know that the patient has nothing but hysteria, but a medical man has his primary duty towards the patient and a proper evaluation of the signs and symptoms by a careful examination and application of the appropriate treatment in the early stages should be his aim. A great majority of the dementia præcox patients in a mental hospital are of the "hebephrenic" type. They are shy, seclusive and solitary; they regard with indifference the events of life. They are taciturn, constrained, withdraw themselves and avoid people. They are cool and indifferent to their relatives and sometimes distinctly hostile to them.

Treatment.—In institutions for the insane, occupation of some sort helps greatly to divert their minds from impulsive acts. In fact, in the opinion of the writer, one cannot provide too much occupation for them. At first the idea of any definite work is resisted by these patients, but with persuasion they could be got round and the effect of systematic work is seen in the improvement in their physical condition and corresponding increase of mental stability. They give up their destructive and dirty habits and in course of time behave well and some of them who have been discharged from hospital have shown sufficient interest in their homes and relatives and a clear outlook on life. Relapses occur in many cases, both in hospital and after discharge therefrom. In one case a return to her home brought on, in a female patient, a very violent form of excitement, the like of which was not seen during her two years' stay in the asylum.

It is important to recognise that an eruption of impulsive acts which initiates this disease is generally due to environmental handicaps, and a careful inquiry into the past history of the patient and his present relationship to the world around him would furnish a clue to the means to be adopted in dealing adequately with his disorder at the onset. Treatment in such cases may have to be applied not only to the patient but to his relatives as well in the shape of sound advice regarding their dealings with him. It is the latter that have to adapt the environment to the patient when he has failed to adapt himself to it. Ungovernable temper, extreme self-consciousness, excessive sensitiveness or emotional instability are some of the points to be noted in prospective cases of dementia præcox and suitable means of prevention should be adopted, for preventive

medicine with which every practitioner is seriously concerned should also include mental hygiene.

Only the extreme types of dementia præcox are found in a mental hospital. A good many mild forms of the disease remain outside and pass through life unnoticed, fighting a hard battle in life, which, had they been early diagnosed and treated would perhaps have been rendered more happy individually and more useful to society.

EXPERIMENTS IN AIR EMBOLISM.

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MANY articles have appeared from time to time in the *Indian Medical Gazette* and other medical journals, on the experiences of various medical men, of the introduction of air emboli into the veins, as also have discussions on their danger to life or otherwise. The description of the following experiments on cows and bulls may therefore not be out of place and are given for what they are worth.

I was at the Lawrence School, Ghora Gali, as Resident Medical Officer from January 1922 to June 1923, and during this period one of my routine sanitary duties was to inspect the school slaughter house, where almost every second or third day two cows or young bulls were killed by the school butcher to provide beef for the school children and staff. The butcher was a Mohamedan and the usual method of slaughter was to pass a rope around the legs, then to throw the animal suddenly by twisting the head and neck round by the horns while a second man tripped the legs with a strong bamboo, and once down, the animal would be kept on its side, the four limbs secured tightly together and the twisted neck cut down upon with a sharp knife (*halal*) until the carotids on the two sides were severed and also the windpipe and gullet. The wound in the neck would now be made to gape by holding the head well back until the great vessels had emptied themselves and life became extinct. This knack of twisting the neck and keeping it so, rendered quite powerful animals absolutely harmless and motionless on the ground for the subsequent deliberate use of the knife.

I had a little while previous to this been making certain observations on these animals in a different direction and as so much experimental material was available the thought struck me to try the effect of air emboli to produce death in the hope of bringing it about with less torture, as to any onlooker the above process was somewhat cruel and painful.

The following experiments were therefore tried. I will first mention certain difficulties which I encountered. Direct puncture through the skin into the vein (which one does

so easily in human beings) is difficult, or at least was so in my inexperience of this operation on animals, and the vein needs to be dissected out. It is difficult to get directly through the skin (which is much too tough to pierce) into a cow's veins and at the same time use the precision which is required in these little operations. Big as the veins may appear against the skin, once punctured and manipulated they tend to collapse easily, so that a careful effort should be made to enter the vein with the needle at the first attempt. Incising the vein and tying in a cannula increase the difficulty and lead to quicker collapse of the vessel but a large quantity of air is more easily injected and with greater certainty. At first veins on the legs were chosen but were not always found to be prominent enough, and besides, a sudden though even very limited jerky movement, with the weight of a bull or cow behind it, usually meant breaking a needle. Next, the neck veins were tried (the jugular veins are used by veterinary surgeons) but these were also unsuitable and the skin too thick over them, besides having to contend with the awkward twisted position of the neck already alluded to. Finally the large prominent veins on the belly were selected and, though very mobile under the skin, the skin over them was thin enough to be dissected easily and quickly to get at these vessels. This proved satisfactory under the circumstances. I was single-handed and without any elaborate steadying apparatus; I daresay with the help of a veterinary surgeon better sites and methods might have been suggested for vein puncture.

Experiment No. 1.—Having dissected out a vein, 10 c.c. of air was injected gradually by puncture into the lumen of the vessel with a 20 c.c. serum syringe. This produced no symptoms in the animal.

Experiment No. 2.—The same procedure was adopted as in experiment No. 1 but 20 c.c. of air was injected. No result followed and the animal appeared quite unaffected.

Experiment No. 3.—The vein was entered and 20 c.c. of air was injected with one sharp movement home of the piston in the hope of producing a continuous column of air in the vessel. There was no apparent effect on the bullock after this and so the syringe was quickly removed from the needle (which was left in the vein), the piston drawn up, and another similar brisk injection of 20 c.c. of air given. The expected death of the animal still seemed remote and so the syringe was removed from the needle for a third 20 c.c. injection of air, but as some blood had entered the barrel and made movement of the piston difficult there was a little delay in re-fixing the syringe to the needle, which had by now

become blocked with clot. After this experiment the conclusion was naturally arrived at that a syringe with a much greater capacity was necessary. An ordinary 4-oz. glass urethral syringe was tried but as the piston was defective sufficient pressure was not available due to slight leakage in the process of forcing air through the needle or cannula, although it could be made to work with the latter as less pressure was necessary. Resort was therefore had to an ordinary 4-oz. metal ear syringe with a true-fitting piston and a short rubber connection leading to a cannula. The glass urethral syringe was eventually used in the last experiment but one—with a positive result—as will be seen later.

Experiment No. 6.—Having been defeated out and a Roger's cholera cannula carefully tied in; this was attached to a rubber tube leading to a 4-oz. glass urethral syringe. Four ounces of air was injected quickly with no visible effect on the cow. This quantity of air in all probability did not wholly enter the vein as I discovered later that the piston was not satisfactory, and far from true-fitting, as explained above.

Experiment No. 5.—On this occasion a cannula was tied into the vein as in the previous experiment and four ounces of air was emptied into it with the help of a ear syringe. This had no immediate effect and so the rubber connection was removed, the piston pulled up, and a further charge of four ounces injected. The animal now became somewhat restless and this resulted in the cannula being dislodged from the vein, but death nevertheless did not take place.

Experiment No. 6. Having been defeated so often in arriving at the lethal dose of air which should be injected into the vein of a cow or bull the following experiment was made. I acknowledge it was very unscientific as the volume of air was not measured and the quantity used can therefore only be guessed at roughly. As before, a cannula was tied in and from it a rubber tube was connected to the barrel of a 4-oz. urethral syringe from which the piston had been removed. To the open upper end of the barrel of the syringe I applied my lips and steadily blew air into the vein. A low gurgling sound was heard going up the vein and after about 10 to 15 seconds of steady blowing the animal got restless and then to all appearances became suddenly unconscious; the eyes glared and were turned upwards, the respiration became spasmodic, the body and limbs turned rigid and death ensued. I should imagine I blew a pint and a half or more air into the circulation in this attempt.

At the postmortem examination immediately after this experiment the right auricle and

ventricle were found full of an admixture of air bubbles and blood, the former varying in size from $1/16$ to $1/3$ of an inch in diameter, and the roots of the superior vena cava, inferior vena cava, and pulmonary artery were similarly filled. The left side of the heart was empty except for a trace of blood with very occasional fine air vesicles in it, but these may have been admitted in the process of cutting with the soiled knife already used on the right side. No consolidated clot had yet formed around these air globules. The whole appearance was frothy and there were more fine bubbles than large ones.

Experiment No. 7.—As the last experiment gave no exact idea of the quantity of air required to produce death I finally decided to try one further experiment. The death of the cow in this case was produced under rather amusing circumstances and not, after all my labour, exactly from embolism.

By the Mohamedan religion it is required that all animals whose flesh is intended for consumption should be killed by cutting of the neck, i.e., "*halal*." This religious point in the killing did not affect experiment No. 6 as the Mohamedan butcher had, unintentionally on my part, been taken unawares but, however, he had my genuine apologies when I discovered my mistake.

For this experiment I secured a large motor pump with a 24-oz. barrel and had a well-fitting metal piston made for it. The same procedure was adopted as in the previous experiments. The large inrush of air produced a slight gurgle in the veins and then as the end of the injection was nearing, the animal commenced to be somewhat restless, the respiration became jerky, the limbs stiffened and undoubtedly death would have followed. But the butcher's anticipation at this moment was surer than mine, from previous experience,—for I suddenly found the animal being shaken to and fro by someone and on lifting my gaze from the site of operation I found "*halal*" had commenced to be performed before the death I was in process of producing by air embolism, had been completed.

On opening the heart of this animal about twenty minutes later the left side was found empty and the right side was practically so and only contained a little frothy blood adhering to the posterior wall of the ventricle. The large vessels appeared to have drained themselves through the neck wound. All the other five animals experimented with were slaughtered by the butcher after an hour or so but no air emboli were found in the heart or large vessels.

Discussion.—The results of the following table experiments are interesting and will therefore be mentioned first. When air is injected into the bottom of a tall open vessel containing a mixture of glycerine and water,

of the specific gravity of the blood and resembling it in viscosity, part of the air splits up into fine globules and becomes disseminated through the fluid while other bigger bubbles rise to the top and either remain on the surface of the fluid or if blown up rapidly, leave it. The fine suspended bubbles after a little while also gradually rise to the surface. If this experiment is tried with glycerine, which is of considerably higher specific gravity than blood, part of the air breaks up into very fine globules which remain suspended for a much longer time before finally rising to the surface, the larger bubbles also rising to the surface but somewhat slower than with the previous fluid. The behaviour of air emboli in an artificial circulation made up with an ordinary Higginson's syringe with glass and rubber tubing of even calibre interspersed in its course and with the use of the above mixture, with a specific gravity of 1056, is as follows:—

The glass tubing in the apparatus showed all changes very clearly, and in all, twelve feet of combined glass and rubber tubing was used to give plenty of circulating room. The apparatus was laid on a table (ordinary lying position of a patient) and the fluid circulated; then the rubber tubing representing the vessels was entered with a serum syringe needle and air injected very slowly. However slowly the air was injected each downward movement of the piston showed one discrete and visible bubble of air admitted to the circulation, so that at the point of injection and a little while after, each injection—or successive injection as it were—caused a bubble or bubbles which remained entire, and there appeared no tendency for this air to break up into smaller bubbles on entering the moving fluid in the tubing. Directly these bubbles came round into the syringe bulb they emerged as many minute globules which were in turn broken up still smaller each successive time they passed through the bulb and were subjected to the churning or pressure action of it. If a similar state of affairs occurs in the human circulation then it is possible that in the right heart all small air emboli admitted in error soon get broken up and on reaching the lungs must be partly absorbed at any rate.

In the same experiment when 10 c.c. to 20 c.c. of air is injected rapidly it enters the circulating fluid in large and small bubbles indiscriminately. The large globules are an inch or more long and on entering the bulb they break up, but, nevertheless, many large air spaces run round the circulation for a fairly long time and are not eventually broken up to any fine degree. To imagine this process going on in a patient's circulation suggests immediate danger to life. The tubing of the Higginson's syringe and the glass and rubber

connecting tubing used was 3-8ths of an inch in diameter, but if some rubber tubing the size of a No. 6 or No. 7 Jaque's catheter is let in then the bubbles of air are broken up into finer emboli but the rate of the circulation is naturally slowed if the same squeezing power is used on the bulb.

In the above experiments, during the suction of the syringe, or diastolic period, there was a little breaking up of the air bubbles noticed in the tubing, but to no great extent as compared with that during contraction when in the bulb itself. With glycerine (specific gravity 1260) and with mixtures of it with water (of a higher specific gravity than the blood) it is very difficult to get the circulation to go round and much force is required on the bulb, but the breaking up of the air bubbles is more complete, particularly when only a few are admitted. The question arises as to what happens to this air on entering the circulation. It is undoubtedly removed or absorbed by the blood during circulation as these little accidents must occur daily; yet no adverse reports come to hand. Some writers have suggested that there is probably a rapid breaking up of the air bubbles by a churning process of the circulation, especially so in the heart itself, and which thus get quickly absorbed. The splitting up in the heart apparently occurs, judging from the above trials. Presumably, of course, some of the oxygen at any rate is soon taken up by the blood while in the veins, as we know how quickly the tarry fluid from these vessels changes its colour even outside the body when in contact with the atmosphere for a short time.

Quite large-sized air emboli have been found in the heart at autopsies in cases where there have been wounds of the lungs, and these globules have been coated with firm clot. A recent writer has also attributed gangrene of the intestines to similar air embolism in these cases. Whether a failing circulation retards the disintegration of large air emboli and their subsequent absorption and leads to the deposit of thrombus around them is a point naturally worth bearing in mind. It is known how quickly blood clots when in contact with the air; so also when a circulation is weak and slow, would we expect the possibility of the same blood, being in contact with the air in the vessels for a longer time, tending to coagulate around it. Then there is also the possibility of their formation a very short time before and after death, with the stagnation of the blood stream, as the findings have after all only been postmortem.

If one visualises the circulation in the tail of a tadpole, with the corpuscles as air emboli, it can easily be imagined how thrombus is likely to form with a hesitancy of these air corpuscles against the vessel walls, as the

circulation is retarded at the gradual approach of death. In diseases where the specific gravity of the blood rises and the circulation is weakened or slowed, air embolism would be risky, though perhaps the entry of a very small quantity of air should be better broken up in the heart due to the increased viscosity.

The pulse rate of an ox is 45 per minute, so that the human being with a pulse rate of 70 to 80 per minute is at some advantage compared with these animals if it is possible that the velocity of the circulation—which, by the way, is actually much slower than the pulse wave—helps to prevent thrombus forming around the air. The pulse rate of the dog is about 75 to 90 per minute and, of all domestic animals, the nearest to man. It is just possible that its circulation rate of 250 mm. per second with the systole and 127 mm. per second in diastole (approximately 10 inches and 5 inches per second respectively), would about roughly correspond with the human circulation. Supposing that the blood takes 15 to 20 seconds or probably much more from the time it leaves the heart to its return to that organ (jugular methylene-blue test), and granting an average of five minutes as the period taken for blood to coagulate outside the body, it would be reasonable to expect that a few bubbles of air, admitted by chance, would be of very small consequence as they will have travelled around in the circulation (if this does happen) fifteen times in five minutes and will thereby have been given plenty of time to be churned and broken up into very small bubbles and to get absorbed. From physiological experiments we know that the velocity of the blood-flow is greatest in the large arteries; in the capillaries it varies from 0.5 to 1 mm. a second, and in the large veins it runs at about half the rate as compared with the arteries. These facts give the expectancy of thrombus formation with more certainty in the capillaries and veins. In those diseases where there is thrombosis these are the more common sites. On the other hand, arriving at the capillaries the air would have reached a very fine state of division, so that its absorption in this position is more feasible.

Physiologists are somewhat divided in their opinion as regards the coagulation of the blood, but the prevailing idea is that thrombin is brought about from thrombogen and calcium salts by the activating material thrombokinase which is present in most of the tissues of the body and is particularly produced from the blood-platelets which are only supposed to be formed after the shedding of blood and its contact with a foreign surface. It is known that the blood of birds contains no platelets and will not clot unless it comes in contact with the tissues or tissue extract is added to it, so that in all probability the circulating blood

contains no thrombokinase. In our experiments the question arises as to whether the admission of air into a vein produces a condition in the vessels akin to the shedding of blood and contact with a foreign substance. If so, then there must be a subsequent production of blood-platelets and thrombokinase in vitro resulting in clot, which will mean that any quantity of air admitted into the circulation is fraught with this danger. On the other hand, to help the outcome, we know the affinity hæmoglobin has for oxygen and that blood-plasma might dissolve nitrogen, carbonic acid and oxygen,—all constituents of air,—and that phagocytosis of the white blood corpuscles would come into play, so that in the case of a few small bubbles of air entering the circulation the blood itself probably has the power to deal with them.

The foregoing points would lead one to suppose that with an active circulation the entry of a few small air emboli is really a negligible quantity.

During my personal experience of the past fifteen years with intravenous medication I have several times accidentally admitted a few air bubbles into the circulation, some of which were quite large, but remember no ill effects resulting. In my earlier days I had a great dread of them, having been warned of the danger by my teachers and later by colleagues, of the entry of even the smallest bubble of air into the circulation, but I have since found this theory to be quite erroneous. In passing, though, I will mention certain bad results which I have experienced with intravenous injections although they do not really bear on the subject.

Some years ago I remember a patient developing paresis of the right arm and another developing slight paralysis of one side of the body; both occurred after an intravenous injection of salvarsan. These two cases soon recovered and were in all probability due to blood clot. I was absolutely certain that no air had entered the vein, but what I had noticed was that as the needle entered the vein there was a very pronounced inrush of blood into the windowed tubing attached to it, and that as the injection was started this blood, which must have already clotted, was naturally driven back into the circulation. In the case of intolerance and severe reaction with certain preparations it is advocated by some to desensitise the blood *ex-corpore* by allowing this regurgitation of the blood from the vein into the apparatus or syringe, and then after some minutes to inject this mixture of venous blood and solution. After the above experience I have always taken the precaution to have the torsion on the upper arm removed as quickly as possible once the vein is entered, as I feel that no two bloods behave alike as regards clotting once they leave

vessels. In another-patient, with resistant malaria, who tolerated quinine quite well, I gave an intravenous injection of quinine hydrochloride. This was soon followed by curious blindness in one eye, which lasted for about 48 hours. It was said by some to be an idiosyncrasy to quinine. No air bubbles had entered the circulation but a fair amount of blood had come into the syringe, and was passed back into the vein. This was the patient's second injection, the first having caused no untoward symptoms. At the third injection care was taken not to admit blood into the syringe and the process was completed without similar after-effects. I leave my readers to decide whether this was due to blood clot or not.

Conclusions. A few small bubbles of air injected into a vein at a slow rate are apparently harmless, and a like remark would also appear to apply to a small continuous column of air, judging from the results of these experiments. In the last experiment 24 ounces of air was sufficient to produce the death of a bull weighing approximately 500 lbs., so that a man weighing 10 to 11 stone would proportionately take about 6 to 7 ounces as the lethal dose. Rabbits succumb very easily to air embolism but they are somewhat delicate and susceptible rodents, and as human beings we might be similarly qualified, as our endurance can hardly be compared with the beasts of the field on whom the experiments were tried. Hence the lethal dose would in reality probably be less than 6 or 7 ounces. On the other hand, the velocity of the circulation and pulse rate (45 per minute) in oxen are both slower than in man, and the specific gravity of their blood—which is 1060 or slightly more—is higher than in man, the three being qualities likely to give a greater susceptibility to the effects of air emboli although their endurance may be greater than man's.

The first noticeable symptoms were produced in experiment No. 5 when eight ounces of air was injected. Assuming this quantity to be the dangerous limit for the animals used, then, working it out proportionately on weight, a volume of 2 ounces and 2 drams would be unsafe for man. An error of this magnitude could only occur from very gross neglect.

Blood of a thicker consistency, i.e., of a higher specific gravity than the normal of 1056, must flow through the vessels with difficulty and be more prone to clot around air globules. If, therefore, in disease the specific gravity of the blood—for any reason—goes up with a retardation of the flow, then the admission of air into the veins should be carefully guarded against. In those diseases in which the coagulability of the blood is increased these precautions should also be

taken. When severe hæmorrhages have taken place the blood coagulates quicker than normally, and in these cases also the entry of air during intravenous transfusions should be especially excluded. In such cases, before any quantity of fluid has been transfused, a large air embolus entering the feebly-acting right heart would be likely further to embarrass its action, causing clotting and death, which might easily be put down to the original progressive collapse. In anticipation of these accidents with air emboli of large size some antidote in the form of an injection for immediate use, to reduce the coagulability of the blood, suggests itself.

TREATMENT OF SOME ABDOMINAL CONDITIONS WITH INFLATION OF OXYGEN GAS.

By RAJINDER S. GREWAL, L.M.S. (S'pore),

*Civil Assistant Surgeon,
Civil Hospital, Maymyo, Burma.*

TREATMENT of a cold abscess by filling its cavity with oxygen after evacuation of pus had been some time back warmly advocated by Lieutenant-Colonel E. R. Rost, L.M.S.; the results attained by him were by no means unsatisfactory but he did not try the value of oxygen in certain abdominal conditions. It was with this intention that the experiment of inflation of the abdomen with oxygen was undertaken. During the past few months this method of treatment has been used with great success at the Civil Hospital, Maymyo, in a few diseases of the intestines, peritoneum and mesenteric glands.

First a case of tubercular diarrhœa which had not been amenable to any form of treatment, including emetine and astringents, was treated with inflation of the abdomen with this gas. The result was very encouraging and it made us extend our investigation further in the domain of abdominal diseases limited to infections in which tubercular bacilli have been the causative agent. The results thus far obtained have been highly successful and gratifying, therefore they are published for the information of the medical profession with a hope that they will report the value of this gas in similar ailments after giving a fair trial to this method of treatment.

INDICATIONS OR DISEASES IN WHICH THIS TREATMENT PROVES BENEFICIAL.

1. *Tubercular Diarrhœa.*—This form of diarrhœa is most difficult to treat; in some cases the diarrhœa cannot be checked. When pills of plumbi subacetate, emetine and astringents have no effect then the treatment by oxygen should be resorted to.
2. Another condition in which this treatment proves a success is chronic tubercular peritonitis.
3. It may also be undertaken in cases where free fluid in the peritoneal cavity is present due to chronic tubercular peritonitis.
4. The last, but not least, is "tabes mesenterica"—a disease not so commonly met with.

PREPARATION OF THE PATIENT BEFORE OPERATION.

General.—The patient is kept confined to bed for a day or two previous to operation. Ordinary nourishment to which the patient is accustomed is allowed. In cases of tubercular diarrhoea solid diet should be withheld.

Local: Preparation of the skin.—The skin of the abdomen is well scrubbed after shaving the hair, if any, with a solution of soap and rectified spirit. Then the solution is washed off with warm water and the skin dried. Next the skin is painted with a solution of Hydrarg. Bin-iodide:—

| | | | |
|---|----------------------------|----|-------------|
| R | Hydrarg. Bin-iodide Rubri. | .. | grs. xvi. |
| | Pot. Iodide | .. | grs. xvi. |
| | Spirit Methylated | .. | ozs. xii. |
| | Aqua | .. | ozs. xviii. |

And finally sterilised dressings are put on and a "many-tailed" bandage applied.

A hypodermic injection of $\frac{1}{4}$ gr. morphia and 1|100 gr. atropine is given an hour before the appointed time for the operation.

TECHNIQUE OF THE OPERATION.

The technique of the operation may be divided into four different stages:—

1. The anæsthetizing of the skin.
2. The opening of the abdomen.
3. Inflation of oxygen gas.
4. Closing of the abdomen.

1. *The anæsthetizing of the skin.*—The site of incision is anæsthetized with one of the local anæsthetics in common use, e.g., cocaine, novocaine, quinine and urea, or any other suitable drug. In our cases apothesine and adrenalin was the drug of choice and it was found that a 2-per cent solution gives much better results than a 1-per cent solution. The solution is prepared by mixing 1 tablet (apothesine gr. 1|3 adrenalin 1|25000 gr.) in 1 c.c. of water or normal saline. The usual amount of solution required for a case varies from a half drachm to two drachms, but on the average one drachm solution is sufficient. The solution is injected into the middle line with a hypodermic syringe or Barker's local analgesia syringe. An interval of five to ten minutes is observed before commencing the second stage of the operation.

2. *The opening of the abdomen.*—The second stage begins with the incision of the skin and ends with the insertion of a purse-string suture round the peritoneal opening.

A small incision 1 in. \times 1½ in. long is made in the middle line midway between the umbilicus and symphysis pubis; fascia and muscle is cut through and muscles separated by blunt dissection and peritoneum reached. The peritoneum is then caught between two forceps, opened and snipped and a purse-string suture applied round this opening. Care should be taken to prevent the peritoneum from falling into the abdomen.

3. *Inflation of oxygen gas.*—Now a tube conveying oxygen is thrust into the abdomen and the

suture ends tightened around it so as to prevent the leakage of gas. When it is full a general discomfort is complained of by the patient and the distension is visible. (One of our patients remarked "Stop! my belly is full.") The tube carrying the oxygen is withdrawn and the purse-string suture tightened and tied.

4. *Closing of the abdomen.*—Having inflated the abdomen with oxygen the wound is closed layer by layer; a few interrupted skin stitches or Michel's clips are applied, the dressings finally put on and the abdomen bandaged.

APPARATUS REQUIRED.

The apparatus required for this operation is very simple and can be easily made at most of the district hospitals where an oxygen cylinder is available. It consists of an oxygen cylinder and an I.R. tube leading from its outlet to the bottle of hydrogen peroxide, at the end of which a small glass tube is inserted. The tube carrying the oxygen dips into the hydrogen peroxide; the oxygen is thus washed and again carried through a tube which leads from the hydrogen peroxide bottle just above the fluid surface and ends where the glass connection is. Another I.R. tube which is previously connected with a brass tube or a sterilised nasal tube is then connected with the tube coming from the hydrogen peroxide bottle by means of a small glass connection. The flow of oxygen is regulated by the key; it is essential to regulate the flow as a sudden rush of oxygen into the bottle generally pushes the corks out of the bottle with a tremendous noise resulting in unnecessary delay which is undesirable when the patient is on the table.

LENGTH OF TIME REQUIRED FOR AN ABDOMEN TO REGAIN ITS NORMAL POSITION.

Without the proper criterion to measure the amount of oxygen pumped into the abdomen it is difficult to ascertain the exact period required to dissolve a certain amount of oxygen, but in our cases it was noticed that in most instances a fully distended abdomen regained its normal position within 12 to 36 hours.

Rationale of the Treatment.—It is difficult to advance a theory as regards the way in which oxygen brings about a cure. Whether it is due to its oxidising property or some other property remains to be investigated.

ADVANTAGES OF THE OPERATION.

1. It can be done in subjects who have lung complications and also when the use of chloroform is not safe.
2. Very few instruments are required.
3. There is no danger.
4. It can be done even in small hospitals.
5. Results are good.

My thanks are due to Lieutenant-Colonel L. E. Gilbert, C.I.E., M.D., D.P.H. (Lond.), I.M.S., for permitting me to publish the following cases:—

Case 1.—A Hindu male, aged 20, was admitted into hospital on 30th March, 1925. On examination he was found to be suffering from pulmonary tuberculosis and tabes mesenterica. He was operated upon on 3rd April,

Summary of the Cases.

| Number. | Age. | Sex. | Disease. | Date of operation. | Result. | REMARKS. |
|---------|------|---------------|---------------------------|--------------------|------------------|--|
| 1 | 20 | Male. | Tabes mesenterica .. | 3-4-25 | Improved .. | Later died of pulmonary tuberculosis. |
| 2 | 40 | Male. | Tubercular diarrhoea .. | 30-7-24 | Apparently Cured | .... |
| 3 | 8 | Female child. | Tubercular peritonitis .. | 27-1-25 | Greatly improved | Apparently well. |
| 4 | 42 | Male. | Tabes mesenterica .. | 15-4-25 | Improved .. | Returned to work. |
| 5 | 23 | Male. | Tubercular peritonitis .. | 13-3-25 | Greatly improved | Invalided By permission of Captain H. Williamson, F.R.C.S.E., I.M.S. |
| 6 | 20 | Male. | Tabes mesenterica .. | 18-3-25 | Greatly improved | |

1925, and oxygen was given intra-abdominally. The mesenteric glands which were palpable became small but the patient died later from the effects of general tuberculosis.

Case 2.—A Hindu male, aged 40, was admitted into hospital on 5th July, 1924. On examination it was discovered that he suffered from diarrhoea which was very obstinate and not amenable to any drug treatment. On further investigation it was found to be of tubercular origin. He was operated upon on 30th July, 1924, and oxygen was inflated into his abdomen by Lieut.-Col. L. E. Gilbert, I.M.S. Soon after the operation he began to improve, the stools became fewer and fewer till finally he was cured and discharged from hospital on 26th August, 1924.

Case 3.—A Hindu Tamil, female child, aged 8 years, was admitted into hospital on 7th January, 1925, in a very emaciated condition with a hectic temperature, signs of pulmonary tuberculosis and chronic peritonitis with a small amount of free fluid in the abdomen. Oxygen was pumped into her abdomen on 27th January, 1925, after which she was able to walk about, the fever subsided, appetite increased, and her general condition improved. She was discharged cured, on 8th March, 1925, and is now a frequent visitor to the hospital.

Case 4.—An Indian Hindu male, aged 42, was admitted into hospital on 13th April, 1925, with tabes mesenterica and general debility. On 15th April, 1925, he was given oxygen intra-abdominally. Three days later his fever subsided, appetite increased, and general health improved. He gained in weight and is now well and back at work.

Case 5.—A European male, aged 23, was admitted into hospital on 21st February, 1924, for the treatment of enlarged glands of the right groin and pyrexia. The temperature continued and the glands became soft and finally had to be aspirated and yellow pus drawn. His blood was examined thrice for malarial parasites with negative results. The case was diagnosed as one of tubercle of the lung and peritoneum. During his stay in hospital he had an attack of hæmoptysis and complained of general pain in the abdomen which was soft and doughy. He had seven motions of a pale colour on 12th March, 1924. On 13th March, 1924, he was operated on and oxygen was inflated into his abdomen. On 16th March, 1924, his temperature became normal, pulse improved, and—above all—abdominal pain and diarrhoea ceased. After this he continued to improve till he was discharged on 15th July, 1924, and later invalided.

Case 6.—A Burman male, aged 20, was admitted into hospital on 17th December, 1924. On examination the mesenteric glands were found to be enlarged. On 18th

March, 1925, oxygen was inflated into the abdomen by Capt. H. Williamson, F.R.C.S.E., I.M.S. On 30th March, 1925, his general condition distinctly improved and he was then invalided.

ACTION OF DISINFECTANTS ON MICROBES: AN INTERESTING PHENOMENON.

By Dr. H. GHOSH, M.B.,

Bengal Immunity Research Laboratory, Calcutta.

IN the course of our experiments on acclimatisation of bacteria to disinfectants we observed a very interesting phenomenon. We began our work to find out whether by increasing the time of contact of bacteria and disinfectants the rate and extent of growth of the former declined or increased. During the course of this work we found that certain bacteria showed some growth after one hour of contact with a disinfectant but produced no growth after 3 to 5 hours of contact. After 24 or 48 hours of contact, however, a few colonies appeared at first but gradually the number increased as the time of contact was increased. Before entering into further discussion on this phenomenon and its explanation we should describe the technique which we followed.

Technique.—A twenty-four hours' culture of a certain bacteria in broth was taken and different dilutions of a certain disinfectant were made in that broth culture. These were then kept in the incubator and after 1, 3, 5, 24, 48, 72 and 96 hours respectively, 0.1 c.c. from each of the dilutions was inoculated on to an agar plate. These plates were examined after 24 and 48 hours of incubation and colonies identified and counted. In our experiments we used *B. pyocyaneus*, *B. proteus* (X19), *S. aureus*, *B. coli*, *V. cholera*, *B. dysentericus* (Shiga) and the disinfectants used were iodine (in KI) solution, potassium permanganate, optochin and sublimate.

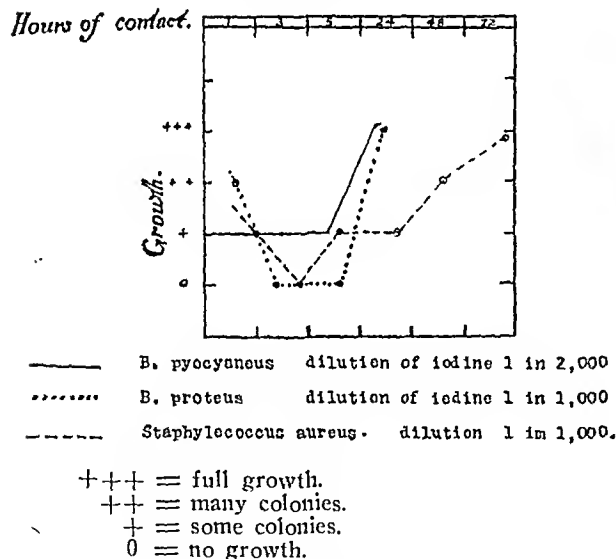
Experimental Findings.—We observed in this way that up to a certain concentration of the disinfectants the microbes were actually killed, but in certain dilutions (vide curve), while there was

absolutely no growth whatsoever up to 5 hours of contact, colonies appeared after 24 or 48 hours of contact. The number at first being a few increased as the time of contact was increased up to a certain limit. It was also noticed that in 1 to 5 hours of contact there were only a few colonies which, as the time of contact was allowed to increase, became innumerable. In the latter case it was no doubt due to acclimatisation of the microbe.

In the accompanying charts we have indicated the dilutions in which the growth increased from a few to innumerable colonies or from none to many. To determine the phenomenon of acclimatisation we made dilutions of the disinfectants in bouillon of the highest concentration in which there was growth, and then inoculated the acclimatised bacteria in one tube and the non-acclimatised bacteria of the same strain in another. We repeatedly found that there was growth of the acclimatised bacteria, whilst there was absolutely no growth of the non-acclimatised bacteria.

Explanation of Charts.—**Chart No. I.**—It can be seen that in chart No. I. *B. pyocyaneus*, in dilutions of 1/2000 of iodine, shows very slight growth after 1, 3, or 5 hours of contact, but after 24 hours the growth increases. In the case of

CHART I.

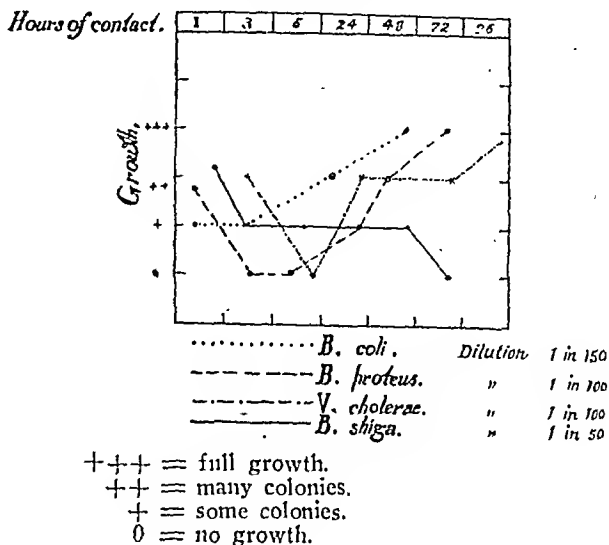


N.B.—Up to dilution 1/500, staphylococcus and *B. proteus* die quickly. *B. pyocyaneus* does not grow up to dilution 1 in 1000.

B. proteus (X19) there is absolutely no growth after 1, 3, or 5 hours of contact, but in dilutions of 1/1000 of iodine there is full growth after 24 hours. Almost similar results are found in the case of *S. aureus*.

Chart No. II.—*B. proteus*, in dilutions of 1/100 of permanganate, does not show any growth after 3 or 5 hours of contact, but after 24 hours of contact colonies begin to appear. Similar results are found in the case of *V. cholerae*. *B. coli* shows a few colonies at first, but after 24 hours there is abundant growth. *B. dysentericus* (Shiga), however, resists the action of disinfect-

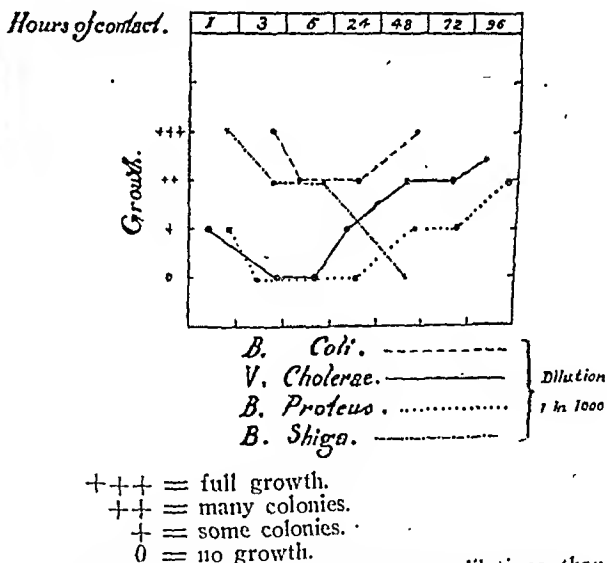
CHART II.



ants up till 48 hours of contact, but after that period dies out totally.

Chart No. III.—With optochin, in a dilution of 1/1000, *V. cholerae* and *B. proteus* show growth after 24 and 48 hours of contact respectively, while there is no growth after 3 and 5 hours of contact. *B. dysentericus* (Shiga) is totally killed

CHART III.



B. shiga — No growth in stronger dilutions than 1 in 1000. Growth rich in more diluted solution.

B. coli — Growth in 1 in 500 dilution is similar to that of *B. shiga* in 1 in 1000.

V. cholerae — Stronger dilution than 1 in 1000 gives no growth.

B. proteus — Same as *V. cholerae*.

by the above dilution of optochin. In the case of *B. coli* the growth diminishes up till 24 hours of contact, but after that period there is an increase of growth.

Explanation of the Phenomenon.—The interesting point in the experiment is that the microbes seem to be killed by a certain dilution of the disinfectant up to the first 5 hours of contact but divide and multiply when placed in fresh medium

after 24 hours. We haven't any means by which we can find out the state of the microbes in the disinfectant solution during the period when they are unable to multiply, consequently we are unable to put forward a definite explanation. We may be permitted, however, to suggest an explanation that probably most of the microbes are killed by the disinfectant effect of the chemicals used; others more resistant get attenuated and lose the power of division and multiplication for a certain period,—during which time they show no growth even when placed in fresh medium. This period may be called a period of shock to the bacteria. Later, as the time of contact increases, this condition of shock passes off and they adapt themselves to the environment and begin to multiply again, and on inoculation into new medium show abundant growth.

"STIBOSAN" (VON HEYDEN "471") IN PRIVATE PRACTICE.

By SUDHIR KUMAR DAS, M.B., D.T.M. (Cal.),
Calcutta.

WHILE I was a student in the Calcutta School of Tropical Medicine I was much impressed by the results obtained from the use of von Heyden "471" in the treatment of kala-azar in the wards of the Carmichael Hospital for Tropical Diseases.

With my former experience with other antimony compounds I can say that "471" is much better, perhaps the best, of all antimony compounds that are now available in the market.

I have put the results I obtained in my cases into tabular form for the convenience of readers; the points that struck me most with regard to the compound are:—

(1) The rapidity with which it checks the fever. In my series of cases the average number of injections required to check the fever was three.

(2) The short duration of the treatment; thus the patient is invalided for a short period only.

(3) The rapid reduction in the size of the spleen. The spleen at first becomes thinned out, then diminishes in size, and from the fifth injection reduces very rapidly.

(4) No untoward effects noted. In my cases no vomiting occurred after injection, not even after meals, and no pulmonary complications occurred.

In all my cases the clinical diagnosis was confirmed by the aldehyde test which was strongly positive in every case. The cure* of the cases is judged by the fact that since the course of injections was finished none of them have had any return of fever. After the injections they rapidly gained weight.

TABULAR STATEMENT OF THE CASES.

| Case No. | Age. | Sex and religion. | Condition at the beginning of treatment. | Duration (in months) prior to treatment. | No. of injections to final disappearance of fever. | Total No. of injections given. | Total amount (in grms.) of compound given. | Period of treatment (in days). | SIZE OF SPLEEN. | | Period (in months) elapsed since last injection. | Present condition. |
|----------|------|-------------------|--|--|--|--------------------------------|--|--------------------------------|----------------------------|---|--|---|
| | | | | | | | | | At beginning of treatment. | At completion of treatment (in inches below costal margin). | | |
| 1 | 46 | E. F. | poor | 9 | 5 | 10 | 2.85 | 22 | 4 | P. | 14 | All the patients are enjoying sound health. |
| 2 | 19 | H. M. | poor | 6 | 3 | 10 | 2.9 | 26 | 5½ | 1 | 14 | |
| 3 | 40 | H. M. | fair | 8 | 5 | 9 | 2.6 | 20 | 6 | 1½ | 14 | |
| 4 | 7 | H. M. | fair | 3 | 6 | 11 | 1.52 | 24 | 4 | 1 | 9 | |
| 5 | 12 | H. F. | poor | 3 | 3 | 14 | 2.08 | 28 | 4½ | 1½ | 9 | |
| 6 | 29 | H. M. | poor | 6 | 3 | 9 | 2.48 | 23 | 5 | 1 | 9 | |
| 7 | 17 | H. F. | fair | 7 | 3 | 10 | 2.9 | 22 | 5½ | 2 | 9 | |
| 8 | 22 | H. F. | poor | 8 | 3 | 10 | 2.84 | 24 | 5½ | 2½ | 8 | |
| 9 | 39 | H. M. | poor | 12 | 2 | 8 | 2.3 | 17 | 3 | P. | 7 | |
| 10 | 24 | E. F. | poor | 9 | 3 | 8 | 2.1 | 18 | 8 | 2 | 6 | |
| 11 | 14 | H. M. | fair | 6 | | 8 | 2 | 32 | 3½ | P. | 3 | |
| 12 | 35 | H. F. | poor | 10 | 4 | 10 | 2.9 | 29 | 5 | 1 | 3 | |

E. F. = European female. H. M. = Hindu male.
P. = Palpable but not protruding below costal margin.

H. F. = Hindu female.

I decided to try this compound on private patients so asked Dr. Napier for a quantity of it; he very kindly supplied me with a sufficient quantity to treat three patients. Later on I obtained the drug direct from the firm of von Heyden; it is now available from their agents in India,—Messrs. Allen & Hanburys.

Two of my cases deserve separate mention here. In case 1 the patient had been suffering from piles, heart trouble (a systolic bruit in the mitral

* Spleen puncture is not popular in private practice so this method of testing cure was not attempted. Blood culture, I am told by Dr. Napier, is quite valueless as a means of testing cure.

area), and was anæmic. According to Dr. Napier's advice I started with 0.1 gram of the compound; after three injections the bruit disappeared and the piles were cured when the injections were completed.

In case 3 the feet got swollen after four injections. On repeated examination of the urine no albumen was detected; the swelling passed off itself without any treatment.

The only difficulty about the drug is that it is not always available in the market and the prices are a little too high for poor patients. If the prices are so reduced that it can be used by the poor (kala-azar being more commonly observed amongst the poor than amongst the rich) the combat with kala-azar will be made easier.

In conclusion I offer my hearty thanks to Dr. L. E. Napier who kindly encouraged me to try the compound and also gave advice whenever necessary.

A Mirror of Hospital Practice.

A CASE OF INTERNAL STRANGULATION BY THE SPERMATIC CORD.

By M. N. S. CHETTI, L.M. & S.,
Civil Surgeon, Sagaing.

A YOUNG Burman lad, 17 years of age, was admitted on 28th October, 1924, with a history of pain and distension of the abdomen of 2 day's duration. He was brought from a village in a cart, but walked into the hospital with body bent suggesting some abdominal trouble.

On examination the abdomen was found to be distended like a drum and tender all over. The pulse rate was 90 per minute, the respiration 30 and the temperature was normal. He had just commenced to vomit. Although nothing pointed to any trouble in the scrotum, this was examined. The skin of the scrotum was loose. The testicle with its sac was felt to be tense, but no tenderness was elicited. There was no evidence of bulging of the inguinal canal nor enlargement of the external ring. The usual signs of an ordinary inguinal strangulated hernia were absent. There was absolutely no pain over the ring.

The patient was given an enema with no result. He was immediately prepared for an operation and was put on the table. There was some hesitation about the selection of the site of incision and finally it was decided to open the inguinal canal to find out if there was any cause of obstruction. The incision was made over the external ring both above and below. A small sac was exposed and incised and a small quantity of brownish-red fluid was emptied out. The testicular substance was dark-purple in colour and was found to be tightly gripped at the external ring above the globus major. An attempt was made to pull the testicle downward without success. The external ring was gently and gradually incised; when it was sufficiently cut the testicle went into the abdomen with a snap. There was

nothing else in the sac on the inguinal canal. An attempt was made to search for the lost testicle inside the abdomen through the internal ring, but it failed. The usual operation for hernia was performed and the patient put back to bed.

Three or four hours after the operation the patient passed a large watery stool containing the enema and faecal matter; he passed a good deal of wind and the abdomen gradually began to get flat and soft. The patient recovered without any untoward result, and was discharged on 25th November, 1924, with instructions to come back and show himself after three months, or earlier if there was any further trouble. It is nearly four months since he left the hospital and it is naturally inferred from his non-appearance that he has been doing well up to this time.

The object of publishing this case is to emphasise the importance of careful examination of the scrotum in all cases of acute intestinal obstruction.

Though in this particular case there was no strangulation, either of omentum or of intestines in the external ring, yet the cause of internal obstruction was there.

Further, it is also intended that readers of this article will kindly communicate their views to the writer of this article, directly or through the medium of this journal, regarding the causation and the proper procedure of operating on such cases which are indeed rare.

GANGRENE OF THE TESTES AFTER TORSION OF THE SPERMATIC CORD.

By M. N. S. CHETTI, L.M. & S.,
Civil Surgeon, Sagaing.

A BURMAN male aged 47 years was brought to the hospital on 1st April, 1925, with a history of enlargement of the right testicle with swelling about 9 days ago without any cause.

On examination the tumour was found to be somewhat about the shape and size of a medium-sized mango extending above the external ring. The upper one-third was soft and fluctuating covered by healthy skin—the lower two-thirds hard with oedema of the skin over it. At first sight it looked like a strangulated hernia, but the history and signs were against it. It was diagnosed as a case of hæmatoma of some unknown traumatic origin. The left half of the scrotum and the left testicle were absent.

On making the usual incision for radical cure of a hydrocele, over the inflamed and oedematous area, there was some unusual exudation of blood between the scrotal tissues and the tunica vaginalis. The latter was of a bluish dark colour and very tense. On incising the tunica vaginalis there was some dark-coloured blood with some clots. On clearing up the sac the testicle was found to be bluish-green in colour and quite soft and looked as if it were gangrenous. Now the difficulty arose as to whether the testicle should be removed or not. Not knowing definitely the cause of gangrene the incision was enlarged upwards as far as the external ring, the point at which the

greatest pain was felt by the patient on first examination; it was found that the cord had twisted completely once round on itself just below the external ring, thus causing strangulation of the testis. Although the left testicle was absent from the scrotum it was imperative that the strangulated testicle should be removed. It was accordingly removed above the site of torsion.

So far as I am aware I have never seen a case of torsion of cord causing gangrene of the testicle though it is mentioned in text books. It is very rare indeed.

In this case I think the torsion was due to the free play of the testicle in all directions for want of the lateral support which it has when a second testis is present.

It is brought to the notice of the profession that such torsion of the cord may occur and it is worth while remembering this case which might help us in making a diagnosis of scrotal tumours resembling hæmatoma of the testicle without any traumatic history and that torsion of the cord may occur in people who have only one testicle completely descended into the scrotum.

A CASE OF PEDUNCULATED PAPILLOMA OF THE TONGUE.

By H. J. H. SPREADBURY, M.B., M.R.C.S.,
Monacherra, Cachar.

A. R., male, aged about 50 years, came to see me on 9th March, 1925. He complained of a growth on his tongue, first noticed between two and three months ago. This had rapidly increased in size, and was now causing him great difficulty in eating his food. The growth also showed a tendency to fall backwards during his sleep, and on several occasions he had awoken choking. About a month ago he gave a history of swelling pain and tenderness in the submaxillary region; this had subsided.

On examination I found a large pedunculated tumour, about one and a half inches long, one inch broad and half an inch thick, lying on the dorsum of the tongue, and attached to it by a pedicle half an inch in diameter immediately anterior to the circumvallate papillæ, in the mid line. The tumour was soft, purplish-grey in colour and lobulated at its distal border. There were no signs of ulceration, but the tongue was coated with a thick yellowish-white fur and the breath was extremely offensive. No enlargement of the cervical glands was noted.

He could not be persuaded to remain in hospital to have the tumour excised. A simple ligature of stout thread was therefore applied at the base of the pedicle, he was given an antiseptic mouth wash and allowed to return to his home. He was warned against sleeping on his back until separation had occurred.

The patient was seen again a fortnight later; he said that he had swallowed the tumour with his food on the fifth day after ligation. On examination his tongue was clean, and there was a slightly depressed smooth scar about half an inch

in diameter immediately anterior to the circumvallate papillæ. The scar showed no signs of induration and no cervical glandular enlargement was noted.

The interest of this case lies in the fact that papillomata of the tongue are rare and, when they do occur, are usually sessile; also that malignant changes are liable to occur in them.

A SWALLOWED CORK-SCREW.

By H. M. HANDE, L.M.P.,

Government Lawley Road Dispensary, Coimbatore.

A FEMALE child, aged 3 years and 5 months, in the Agricultural College Estate, swallowed at 7-30 p.m. on 14th May, 1925, a metal cork-screw of the kind usually supplied with the Panopeptone bottle; it measured a little over 1 in. long and had three coils, at the head of which there was a tiny horse-shoe shaped handle. The circular handle which is usually attached to this type of cork-screw had been removed, otherwise the child could not have swallowed the thing. The point of the screw is pretty sharp. The child was brought to me at 8-15 p.m., within less than an hour after the incident—when after a little hesitation whether to give an emetic or a purgative, the latter was decided upon, as I thought an emetic might be unsafe considering the nature of the foreign body. One ounce of castor oil was administered statim and the child was advised to be fed with bulky food such as rice and bread. On 15th May, 1925, another ounce of castor oil was given and the child passed 6 semi-solid and watery motions. On 16th May, 1925, there was no motion at all. On 17th May, 1925, at about 1 p.m. the child had a solid motion in which the cork-screw was found imbedded—nearly 65 hours after the accident.

A CASE OF UNDETECTED GUNSHOT WOUND.

By Dr. PITAMBER PANT,
Civil Surgeon, Bijnor, U. P.

CONSTABLE, Mohammad Ayub, aged 25, was admitted into the Police Hospital, Bijnor on the 16th April, 1925, for arthritis of the left ankle joint. He gave the following history:—About ten months ago he was on special duty and whilst pursuing a dacoit during the night he struck against a stone and tripped. The next morning he noticed that his left ankle was slightly swollen and painful. He applied some tincture of iodine and the swelling subsided within 2 or 3 days but he still felt sore about his ankle. However, he did not mind this and continued to do his work. Later on he went on a month's leave and on return from leave resumed his duty. He did his ordinary work without any trouble, but a week before his admission into hospital he was put on fatigue duty and this set up such a severe pain in his left foot that he had to seek admission into hospital.

On admission there was just a suspicion of the left ankle being swollen. The patient was treated

with counter-irritants, hot fomentations and massage, but to no good.

Any swelling that there was had disappeared after over a month's stay in hospital but the man was still limping and could not use his foot although there was no displacement or swelling. It was then suspected that there might be a fracture of one of the bones of the tarsometatarsal joint. He was, therefore, sent for an x-ray examination to the Dehra Dun Institute when it was discovered that there was a shot lying in front of the left external malleolus (vide skiagram).



This case is interesting inasmuch as the patient himself had no idea that he had received a gunshot wound.

On being questioned again he admitted that shots had been exchanged on the night when he had tripped and that a sub-inspector had been severely hurt with gunshot wounds at the same time; he hadn't any recollection as to whether there was any hæmorrhage from his ankle at the time. An examination, however, showed that there was a minute linear scar on the inner side of his left ankle.

The shot was removed and the patient made an uneventful recovery.

A CASE OF MALIGNANT PUSTULE.

By GANAPATI PANJA, M.B.,

Assistant Professor of Bacteriology, Calcutta School of Tropical Medicine and Hygiene.

B. A., Mahomedan male, aged about 25, apparently in good health, came to the out-patient

department of the Calcutta School of Tropical Medicine with a localised swelling on the front of his left upper arm, near the axilla. The swelling was of twelve days' duration and started spontaneously with a vesicle. It was oval, about $1\frac{1}{2}$ inch long and consisted of several vesicles merged into one another with a depressed central small scab from which strings of swollen lymphatics were seen radiating towards the periphery. The patient had no fever, no enlarged cervical and axillary glands, and pain was slight; in fact he did not seem to take much notice of his disease.

A culture was taken on blood agar and the next day colonies were seen with spiky outlines. They were stained and identified as *B. anthracis*. Further tests were made to prove their identity.

About two days later the patient was seen again and questioned about his occupation. He said that he had been working as a hide bearer



for about two years and had not heard of any of his fellow-workers suffering from a similar disease.

The case is interesting from the following points of view:—

- (1) The disease is rarely seen.
 - (2) There were no toxic symptoms.
 - (3) The central black scab was absent even after 12 days' duration.
 - (4) The site of the lesion was near the axilla although the commonest site is the back.
- The photo illustrates the case.

Indian Medical Gazette.

SEPTEMBER.

THE TYPHUS-LIKE FEVERS.

AN important addition to the literature of this widespread and imperfectly understood disease group is the paper on "So-called Pseudo-Typhus," by Dr. Andrew Balfour, in the *Kenya Medical Journal* of March 1925.

In this paper there are numerous references to records of typhus-like fever in various parts of the world. Most of these have already been referred to by me in various notes in the *Indian Medical Gazette*, but Dr. Balfour's article supplies further information which is of importance to those who are interested in this intriguing group of diseases.

Dr. Balfour gives several references to a condition known to the French as "fièvre boutonneuse," which has been described, in and round Tunis, by Connor and Bruch. This is probably the fever which has been referred to in the English literature as the "spotted fever of Tunis"; it obviously belongs clinically to the typhus fever group, and at one time I thought it likely that the disease might belong to the tick-typhus group,* but as nothing had been heard of the disease for several years and as louse-typhus has been a good deal in evidence in Tunis, I decided that it would hardly be justifiable to include the disease in one of the groups of non-louse-borne typhus group fevers.

Fièvre boutonneuse is not referred to in the 1924 edition of Le Dantec's excellent book on exotic diseases, this fact combined with the absence of epidemiological data in connection with the disease strengthened my impression that the disease might be louse-borne.

Some of the points quoted by Dr. Balfour, such as the usual involvement of palms and soles by the rash, the earlier appearance of the rash and the frequent affection of European women are rather opposed to the view that it is louse-borne typhus. Possibly we may hear more about the disease now that the possibility of ticks and mites being vectors of such diseases is more generally recognised.

Dr. Balfour gives some information of 42 cases of a similar typhus-like fever in Europeans, reported by Dr. Gilks in his *Annual Medical Reports* for 1920 and 1921.

These cases occurred in Kenya, in Europeans, and lice infestation appeared to be very improbable; there was only one fatal case. The Weil-Felix reaction is said to have favoured the idea that the disease is typhus. Evidence has now been brought forward of the existence in many parts of the world of typhus-like diseases which are probably not conveyed by lice; there is no

evidence of person-to-person infectivity and the diseases differ clinically from louse-borne typhus. In some places like Japan and Sumatra the disease has been proved to be conveyed from an animal reservoir to man by mites, in the Rocky Mountain region it has been proved to be conveyed from an animal reservoir to man by ticks. In several cases in India the disease followed definitely after tick bite and the existence of a tick-borne typhus-like fever is almost certain. In other places such as the Transvaal, Nigeria, Kenya, Tunis, Queensland, French Indo-China and recently in the Malay States, cases have been reported which are not likely to be louse-borne but which are typhus-like in their clinical manifestations. The striking feature of all these cases is their association with the conditions of the wilds, and hence they are probably conveyed from an animal reservoir by ticks, mites or other arthropods. Some of the cases give a positive Weil-Felix, others a negative, and others have not been tested.

The tick-borne disease of the Rocky Mountains has been proved to have a pathology essentially similar to that of louse-borne typhus, and some recent workers believe that the mite-borne disease is of the same group. Clinically there are good reasons for a provisional grouping of the louse, tick and mite-borne diseases as "typhus-like diseases" or more simply as "louse-typhus," "tick-typhus," "mite-typhus" and "typhus of unknown vector," as suggested by me.

It must be understood that only the louse-typhus and tick-typhus have been proved to have an essentially similar pathology so that the only justification for including the other typhus-like fevers in the same group is practical convenience and expediency. The classification may prove later on to be unscientific but it has the great advantage of calling the attention of workers to the clinical features and the possible vectors of the diseases. As a rule, the tick-typhus fevers show a negative Weil-Felix reaction. There is a rash which often invades the face, palms and soles; and except in the Rocky Mountains the mortality is low. Mite-typhus usually shows a local papule or sore at the spot where the mite has bitten, the local lymph glands are enlarged; the mortality, except in Japan is usually low.

There are many interesting possibilities in connection with the widely distributed typhus-like fevers; for instance, there is just a possibility that the ticks of the jungle originally became infected from human typhus and so started the disease among the rodents of the wilds. Opposed to this are the slight differences in the clinical manifestations and the usually negative Weil-Felix reaction in the tick-borne disease. The mite-borne disease of Japan does not protect monkeys against louse-typhus, and the clinical manifestations of the mite-borne disease are rather sharply different from those of louse-typhus so that the virus of the two diseases is not likely to be derived from the same ancestor.

* *Indian Medical Gazette*, Jan., 1917.

To the records must be added "Schara boil"; of which 72 cases were described from West Russia, in the autumn of 1917, by Rissom (*Arch. f. Schiffs and Tropenhygiene*, 1918, p. 273). This closely resembles the Japanese river fever in the presence of a local sofe with local gland enlargement and a characteristic skin rash appearing on the 8th to the 12th day.

Mites were not discovered on the bodies of the patients but there was reason to suspect them strongly, as mites were found in numbers on the ears of the field mice of the locality.

J. W. D. MEGAW.

SPECIAL ARTICLE.

THE RAMBLINGS OF A PUBLIC HEALTH OFFICER.

By A. J. H. RUSSELL, M.A., M.D., Ch.B., D.P.H., D.T.M.,
MAJOR, I.M.S.,

Director of Public Health, Madras.

(A paper read before the South Indian Branch of the British Medical Association in March 1925).

WHEN I agreed to speak to this association on some of the experiences of my recent leave, I did not realise how impossible it was to give any adequate idea of my ramblings until I had set myself down to the task. I wish, therefore, to state at the commencement, that if my remarks appear to be somewhat disjointed, as I am afraid they will be, this is largely due to the fact that I have been compelled to leave out so many points of interest.

As you are aware, Colonel Cunningham and myself were deputed to attend the Far Eastern Association of Tropical Medicine congress held at Singapore in September 1923. After leaving India the first port of call was Penang, which is probably one of the most beautiful islands in the world. As in most of the Federated Malay States, however, malaria is common there and we were at once struck with the very ingenious methods adopted to prevent mosquito breeding in the town.

R. L. Stevenson in one of his essays tells how an eager Japanese student welcomed mosquitoes because their bites kept him awake over his books. The method of repelling slumber does not find favour in the towns of Singapore and Penang, nor are the medical men of the Dutch East Indies any less enthusiastic in their efforts at extermination of the insects.

"In Malaya Peninsula indeed where neither cholera nor plague causes any serious mortality, malaria occupies an even more important place in the eyes of the sanitarian than it does in India," and as there is no "financial stringency," the colonial Government is not afraid to spend money and the campaigns conducted against mosquitoes are admirable. This was especially the case in Singapore itself where, in July 1911 a terrible wave of malaria raised the death rate to 85.83 per mille. Later figures show the progress made.

| | | | | |
|---------|----|----|----|-------|
| 1903-12 | .. | .. | .. | 44.11 |
| 1913-22 | .. | .. | .. | 33.73 |

a reduction of 10.38 per mille or a saving of 32,214 lives.

During the conference in Singapore, many very interesting papers were read, but perhaps the best from a scientific research point of view were those presented by the delegates from the Dutch East Indies.

Dr. Walch's paper on "pseudo typhus" and Dr. Van de Velde's on "dengue-like fevers caused by spirochaetes" were models of their kind, and the paper by Dr. W. B. Doorenbos on the Sumatra system of sanitation and health control on the Holland-American Plantations demonstrated the economic value of a carefully

planned health organisation, and made one wonder when it would be possible to have anything so complete in India.

It was the enthusiasm of the Dutch East Indies medical men, particularly Dr. Vogel, Dr. Lonkhuzen and Dr. Walch, which revived the Far Eastern Association in 1921 after an interval of eight years, and it was at the instance of the conference held in that year in Java that the League of Nations health section decided to despatch to the Far East a medical commission with special experience of international public health agreements and of the epidemic diseases of warm climates. The recent conference held at Singapore to discuss the formation of an Epidemic Diseases Bureau for the Far East is the sequel to that commission. Such a bureau will be of immense value in recording and distributing information regarding epidemic diseases in Far Eastern countries.

The conference had long and serious discussions on the question of an international organisation for disease control, with special reference to beri beri, but none of the Far Eastern countries desires to take the initiative lest the industry of its own exporters and millers is disturbed, and the plantation managers will not begin to use brown rice in case they have difficulty with their labour. The result is that progress becomes impossible.

In Singapore a new General Hospital and a new Medical College were under construction, large sums of money having been allocated by Government for this purpose. But as Dr. Hoops said in his presidential address, "overcrowding and bad feeding are the two primary factors in the causation of disease in the cities of the East" and certainly in Singapore dreadful conditions of overcrowding, lack of ventilation and resultant tuberculosis exist in the Chinese parts of the city. Sleeping accommodation is provided in cubicles built like ship cabins with two to three in each cubicle, sometimes 60-80 persons being housed in a couple of rooms.

Better housing for the working classes has been a political cry for many years, but alike in the east and the west, still remains an unsolved problem. In many cities indeed, the slums are a disgrace to civilization. Recent investigations show, moreover that, particularly among Eastern peoples, the great bulk of the population is badly fed and improperly nourished. So long as such conditions prevail, are not the nations of the world wasting money in the building and maintenance of pre-natal clinics, child welfare centres, maternity hospitals, training centres for midwives, post-natal clinics, sanatoria for tuberculosis, venereal clinics and school and dental clinics? Surely these activities merely touch the very outermost fringe of the problems associated with the primary evils responsible for the production of disease. The question arises, what permanent advantage does a child gain at a baby welcome or child welfare centre when its mother is compelled by poverty and ignorance to feed it on rice and kunjies and the home is a dark unventilated hovel, incapable of improvement.

It is quite impossible to make more than passing reference to Hong Kong and Shanghai. The former port, the largest in the world, has grown in population at an enormous rate during the last 10-20 years, and the restricted area available on the rocky island for streets and bazaars is dreadfully overcrowded. Still Hong Kong has a fine University at which large numbers of Chinese students graduate in medicine and arts. The International Health Board takes an active interest in this University, and it so happened that Dr. Shellshear, professor of anatomy, who was the only member of the staff I met, was an old Rockefeller scholar.

In Shanghai, I had my first insight into the Chinese method of collecting and conserving night-soil, a great proportion of the night-soil of the town being carried in barges many miles inland for purposes of cultivation. When the large tanks were filled and covered over and the decks swabbed down, the barges did not look at all unseemly and the whole process was carried out in as sanitary a fashion as possible, although it was obvious

that there was nothing to prevent the spread of hookworm.

Shanghai is a city made up of a group of foreign concession areas plus a Chinese town. The Health Officer of Shanghai, Dr. Davis, who kindly placed his Chief Sanitary Inspector and a car at my disposal, supervises the public health work in the area which formerly comprised the British concession, and the enormous Chinese population of three-quarters of a million living immediately outside have nothing done for them at all. In the circumstances it is surprising that epidemics do not occur more frequently.

In Peking we spent a fascinating fortnight. The bazars are intensely congested and the streets are in much the same condition as those of Madras. When the north wind blows and raises the grey dust, which lies inches thick everywhere, it is not wise to leave the refuge of one's hotel.

I had opportunities of visiting one or two of the better class Chinese houses and found them laid out much on the same plan as Indian houses—with the rooms opening out on a central square. They must have been hot in summer and as I know, were cold in winter, as the paper windows did not give much protection from the icy November winds blowing from the snowy Siberian steppes.

The Rockefeller Foundation have now completed the reconstruction of the Peking Union Medical College and Hospital which were formerly managed by a body of medical missionaries. The whole buildings, modelled on old Chinese architectural designs, have been built on a lavish scale, and the courtyards in marble, and the beautifully carved roofs with their glazed green tiles, gave an impression of magnificence which at first made one full of envy. The total cost amounted to eight million dollars, and I should imagine that the hospital does not have its equal in the world, for modern equipment and fittings. Not only are wards and laboratories fitted throughout with all manner of electrical contrivances, but the kitchens and laundry are entirely run by electricity. The professorial staff, which included the usual number of Scotsmen, were all carrying out research work of one kind or another. The professors of hygiene and of pathology, for instance, during the vacation months, did a great deal of field work, away in the interior, in connection with different epidemic or endemic diseases such as hookworm and kala-azar. This last disease has a very high incidence round Peking itself and has also been reported from other large areas of China. The whole of the college staff gave one an impression of intense keenness and enthusiasm; but it must be very difficult for a Chinese student, trained in such a gorgeously equipped school, to go into the interior and with nothing (perhaps not even pay for months, not to speak of prospects) try to keep up what he has learned and practice the methods which are so easy to conduct in such an up-to-date hospital. The students were few in number, but I gathered that this was not a cause for regret meantime. The college laboratories are small, much too small in my opinion, and I think it is legitimate criticism to say that a great deal of space and money has been wasted in the development of external architectural features which might have been spent much more advantageously. I believe I have the support of Mr. J. Rockefeller, Jr. in this expression of opinion.

Before leaving China, I wish to touch upon a subject which applies with almost equal force to India, that is, the question of the growth of the population. In China, sanitation does not exist, and in spite of the constant destruction of human life from epidemic diseases, and in spite of an enormous infantile mortality, the country is so over-populated that the great majority of the people is continuously and hopelessly occupied in striving to grow, or collect, food sufficient to keep body and soul together. Here is an estimated population of over 600 millions, so engrossed in the mere scramble for the bare necessities of living, that national progress, mental,

moral and spiritual is impossible. And what of India in the same connection? Mathematical analysis of the statistics of its population during the six censuses taken from 1871-1921 show that *under present conditions*, the population cannot increase much further without causing a serious shortage of food, and perhaps it is not realised that already for some years past Madras Presidency has been compelled to import rice in order to feed the present population. It is almost certain that the food question has been at the bottom of all wars between nations. If the Indian population does jump above the asymptotic line, the sequel must be an epidemic or a famine, or it may be a war or a revolution sufficiently terrible to bring the population below the asymptote once more.

Passing over an 18-days voyage across the Pacific, by means of a magic carpet or similar contrivance, we find that in the United States the same questions regarding population are being asked, and the biologist and eugenicist have questioned the ultimate value and wisdom of some of the work which is being done by the public health worker. The new American immigration laws have been unanimously passed because of the same doubt. The constant influx of low grade and highly prolific immigrants from Southern and Eastern Europe, which had passed unnoticed for many years before the war, attracted immediate attention when the United States took stock of her man power in 1917. It was found that the descendants of these Mediterranean races, the lowest classes in America, least fitted for the responsibilities of parenthood and least apt to transmit desirable qualities to offspring, were increasing rapidly, whilst the marked decline in the birth rate of the upper classes continued. It has been calculated that the United States can support a population of nearly 200 millions. The 1921 census showed the population to be 110 millions, so that it is not difficult to calculate the date on which the country will reach saturation point.

Carry the argument a little further and suppose the world population also to have grown in the same proportion as it has been growing during the last four or five decades, and we reach the stage when all the peoples of the earth will be compelled to descend to the scale of life which is now necessary in China, a constant scramble for food. The question arises—can we do anything to prevent such a catastrophe? Many will "pass by on the other side," in the conviction that so long as the food question does not press too strongly in their days, the problem can be ignored. But since the days of Pasteur, preventive medicine has lowered the general rate, diminished the incidence as well as the death rate of infectious diseases, and the latest 'stunt' is the saving of numbers of children under 5 years of age, who a few years would certainly have been doomed to die. Public health activities have therefore added years to the general expectancy of life as well as to the productive and procreative period of life, but it is not so certain that these activities have been wholly for the benefit of the human race. Indeed, as a eugenicist, I am firmly of opinion that in many instances, what I have done as a public health officer is wrong. The humanitarian view which always does and always will influence public health work has been allowed to guide our actions far too long. The biological view must and does condemn the breeding of mental defectives and degenerates, but nowhere is there any system that is to any degree adequate for preventing those unfortunates from procreating their kind. If people would only think of the enormous sums of money and the amount of food wasted in keeping those unproductive classes alive, and the many useful directions on which that money could have otherwise been spent for the nations' benefit, the humanitarian side of our nature would soon show a falling off and we would see to it that methods were sanctioned by law which would effectively sterilise those who by every canon are unfitted for parenthood. I have however rambled on this subject sufficiently long, but it is certain that from the sociological, the eugenic and the public health points of view, these questions require more study than they have hitherto received.

A period of strenuous travelling gave me a general insight into public health administration in a number of municipal and rural areas in the United States, and it may be said at once that from the broad administrative aspect, we in Britain and British-India have nothing to learn from the Americans. In most of the large cities, Chicago being no exception, part-time health officers were employed. Well, even in Chicago I am of opinion that a part-time health officer is a whole-time joke, and I had no occasion to change that opinion when I made enquiries as to the work done. All state and city public health appointments, like other departmental appointments, from the health officer down to the sanitary inspector and the head clerk in the office are subject to the political party in power, and I was amazed to find that in Baltimore for instance, the health officer had been out and into his appointment five or six times in his 30 years' service, according to whether the Democrats or Republicans gained a majority. I must hasten to add, however, that this custom is disappearing to a certain extent, but try to imagine this method carried out in India! Verily, the fruits of office, with a vengeance! Health propaganda work in America is generally very cleverly done and money is freely spent on such campaigns; but in some places it seemed that the method adopted was to frighten the people to death. One bulletin describing the horrors of venereal diseases may be described "as the most ungentle thing in the shape of propaganda I have ever seen."

Americans apply accepted hygienic principles to their ordinary life much more than other European races. Everywhere one saw cupless spouting fountains of drinking water, paper cups or containers, paper towels, etc.; but spitting in the streets is ubiquitous and "spit-toons" or 'cuspidors' are to be met with everywhere in trains, restaurants, etc. Not always does the shot find the bull's-eye, so that conditions are at times quite revolting. If anything the houses are overheated, but American houses are generally much more comfortable than those at home.

Town milk supplies are mostly graded and certified and are dealt with in ideal fashion, but in rural areas and in the smaller towns conditions are no better than those in other countries.

'Prohibition' is not going to be cancelled, as the great mass of public opinion is in favour of it. It is the fashion at present for certain sections of the community to try to defeat the law, and large quantities of wood alcohol, 'moonshine' spirit and similar dope is consumed, but with the next ten years a new generation will have grown up, to whom alcohol is unknown, and prohibition will be an accomplished fact, to the eternal credit of those who believed that alcohol was a stumbling block to the nation's progress and who successfully introduced the prohibitory legislative measure now known as the 18th amendment to the United States constitution.

But my rambling must not further postpone my arrival at Johns Hopkins University, where I spent a very profitable and very strenuous four months studying statistics and statistical methods under the guidance of Prof. Raymond Pearl and his associate Prof. Dr. Reed. It was a little difficult to plunge straight into the differential and integral calculus after an interval of nearly 25 years, but being the only British representative in the cosmopolitan community of 43 post-graduates in the School of Biometrics I felt compelled to keep my end up, and every possible facility was placed at our disposal. Before leaving Baltimore I completed the part of the statistical research on cholera I had in mind when I arranged to go there; but that will be the subject of a number of papers to be published shortly. Johns Hopkins is, of course, the medical school of America, and the whole staff was so imbued with the scientific spirit that it was a pure delight to live and work among them. Several members of the professorial staff were Canadians among whom I would mention Dr. MacCallum, the professor of pathology. He took me over his new pathology block,—a huge seven-storey building, which had just been completed at a cost of 2,000,000 dollars.

At the time of my visit he had no less than 25 post-graduates doing research work under his supervision, and as each of these men did a number of hours tutorial teaching a week, for the 90 medical students on the roll, there were 28 teachers, including Prof. MacCallum himself and 2 university assistants. Dr. MacCallum, the professor of physiology, of dietetic fame, on several occasions invited all those interested to inspect his laboratories and rat houses, where wonderfully controlled feeding experiments were being carried on, and time alone forbids my mentioning any others except Dr. Welch, the Principal of the School of Hygiene, whose name will always be known in connection with the *B. welchii*, or *B. aerogenes capsulatus*, which is frequently found in cases of septicemia and gangrene. My experience in the School of Biometrics confirmed the opinion I had formed, long before I went to America, regarding the official statistics and the statistical forms in use in the medical and public health department in this country, viz., that they are as useless as they could well be. Not that the information that can be obtained from them is useless, far from that; but the present arrangement and tabulation methods are such that information can only be obtained from them with the greatest difficulty. The public health department has managed to convince the Local Government of the desirability of re-arranging and re-classifying and simplifying the forms in use, so that we have already cut out quite a large number of items which had gradually been added but the reasons for which had been long ago lost in the mists of antiquity. I commend the question of revision of statistical forms to the Surgeon-General and the superintendents of hospitals in this Presidency, that is to say, if they desire the statistical information contained therein to be readily available.

The School of Hygiene in Baltimore of which the Biometrics School formed a part, was perhaps the most actively alive part of the whole university. The authorities had recognised that the teaching of hygiene in all its manifold branches could only be done properly by having a large teaching staff, and the Johns Hopkins school had no less than ten professors, including Dr. Welch, the Principal. The subjects were divided somewhat as follows:—

- 1 Principal (lecturer on special subjects).
- 1 Professor of Public Health Administration.
- 1 Professor of Bacteriology.
- 1 Professor of Immunology.
- 1 Professor of Epidemiology.
- 1 Professor of Chemistry.
- 2 Professors of Vital Statistics.
- 1 Professor of Sanitary Law.
- 1 Professor of Sanitary Engineering.
- 1 Professor of Parasitology, Entomology and Helminthology.

During the whole session a weekly programme of special lectures was arranged, these being given by distinguished scientists engaged in different branches of public health. Set lectures by the professorial staff were only given when absolutely essential, and most of the students' time was spent in the laboratories. The course in epidemiology, for example, was eminently practical, each student being given weekly a set problem in connection with a specific epidemic,—data from actual outbreaks of disease being supplied, not 'hypothetical happenings,'—which he had to work out for himself and submit for criticism. During the two terms I attended the School of Biometrics, the lectures number only six to eight all told, and we spent eight hours a day in the laboratory, working problems with the aid of calculating machines which on first acquaintance seemed almost uncanny in their exactness, but later on became essential even for adding up a bridge score. The permanent staff of each department spent a great part of their time in research work. For instance Dr. Raymond Pearl was busily engaged in calculating the hereditary effects of alcohol and other similar substances on generations of flies while the seven or eight research scholars were all carrying out different pieces of statistical health

work under his guidance. The constant mental stimulus experienced in an atmosphere of this kind was remarkable, and in my opinion was the most valuable return I had for the expenditure incurred. I have described in some detail the School of Hygiene as I saw it in Johns Hopkins, as I wish in conclusion to plead for an improvement of the teaching of hygiene in Madras. It is now some ten years since the university asked me to revise the regulations for the B.S.Sc. degree; but the time is now ripe for another drastic revision and for more drastic proposals regarding the necessary teaching staff, if this Presidency is to maintain its position as the pioneer in public health work in India. Now that a real live public health department has come into existence with a trained staff in each district, not only must all would-be candidates receive thorough training, which I maintain it is impossible for them to get at present; but there must be provision for post-graduate and refresher courses at which health officers may add to their equipment in their fight against disease. This implies the formation of a School of Hygiene or an Institute of Public Health, call it what you will; but, whatever the name, the institution must have a suitable number of teachers with special knowledge of the subjects they profess. The term "principles of hygiene" means nowadays not only the general practice of preventive medicine, general sanitation and administration but includes hygiene of childbirth and infancy, school hygiene, mental hygiene, industrial hygiene, tuberculosis, venereal diseases, control of food supply, sanitary construction and planning, selection and supervision of water supplies and port and marine sanitation. While it will probably be impossible, for many years to come, to emulate the staff of the Johns Hopkins School of Hygiene, nevertheless I would suggest that in Madras the minimum requirements now are:—

- (1) a professor of hygiene (including public health administration and sanitary law,
- (2) a lecturer in chemistry,
- (3) a lecturer in bacteriology and immunology including parasitology and possibly entomology and helminthology,
- (4) a lecturer on vital statistics and epidemiology;
- (5) a lecturer on sanitary engineering,
- (6) assistants to (1), (2) and (3) and possibly (5).

Practical courses on each of these subjects would of course be given. This staff would probably also be able to give the necessary courses of instruction to sanitary inspectors but the M.B. class in hygiene, at least, ought to be carried out by a separate teacher attached to the medical college staff.

These proposals may seem extravagant to some of my audience, but you will perhaps realise how my ramblings carry me when I add that, in my opinion, they are the bare minimum now and will require amplification in years to come; for I envisage a time, not so far distant, when the Government Medical Department will be totally abolished, and when a State Public Health Department will have extensive ramifications over every district in the Presidency and will be safely entrusted with the protection of the population from disease, a function than which none can be higher or more soul-inspiring.

Current Topics.

Encephalitis Lethargica.

By C. M. HINDS HOWELL, M.D., F.R.C.P.
Brit. Med. J., March 7, 1925, p. 437.

In the spring of 1918 a series of cases appeared in England which presented certain novel features. Since that date we have had the disease constantly with us. In January 1919, notification was made compulsory by the Local Government Board. The number of cases notified since then has been: 541 in 1919, 890 in 1920, 1,470 in 1921, 454 in 1922 and 1,123 in 1923.

The incidence of the disease is highest in the winter months January, February and March. The age incidence is fairly evenly distributed. The disease may occur in babies or septuagenarians. The disease is contagious to only a very slight degree; in this respect the disease resembles poliomyelitis and meningococcal meningitis. But cases are on record of direct spread by contagion, though their numbers are few.

In 1919 and 1920 Strauss, Hirschfeld, and Loewe, succeeded in reproducing the disease in the monkey (*Macacus rhesus*), and in rabbits, by using emulsion of brain from cases of encephalitis lethargica. They were also successful with washings from the nasopharynx of living patients. They isolated a virus from this material which proved to be a filter-passer, and also to be capable of preservation in glycerin. In these respects it closely resembles the virus of poliomyelitis.

It is probable that in both these diseases as also in meningococcal meningitis, the infecting agent gains access to the central nervous system through the nasal mucosa, and that in all of them "carriers" exist.

A review of past influenza epidemics reveals the fact that cases presenting a clinical picture very similar to that of encephalitis lethargica occurred in these times. It seems clearly established that epidemiologically there is a close connection between influenza and a group of diseases affecting the nervous system, of which encephalitis lethargica, cerebro-spinal fever, and poliomyelitis are members.

The onset of the disease may be acute or very insidious. The oculo-lethargic group of cases may show diplopia of doubtful origin and little else. The initial period in these insidious cases may be prolonged, constituting what may be regarded as a prodromal period in which the chief symptoms are lassitude, somnolence, slight headache, depression, and irritability. When the disease enters on a more active stage, and in cases of sudden and acute onset, fever is always present. Its duration may be matter of hours, or it may be present for weeks, but the febrile period is as a rule short. In two cases the patient was febrile for a period of eight weeks. One of these patients recovered. Although commonly of low grade, high degrees of fever, sometimes even hyperpyrexia, may occur. Abdominal pain associated sometimes with vomiting, may occur. Polypnoea with periods of apnoea has been observed on several occasions. Drowsiness is one of the striking features of the disease, both in its active stage and as a sequel. It is often one of the earliest symptoms. The condition of drowsiness frequently advances to one of seemingly profound lethargy; it is remarkable how a patient in such a condition can be roused to answer a question intelligently, but at once relapses again. The lethargic periods often show remarkable remissions.

With this profound lethargy the patient may frequently suffer from insomnia. This may simply be inability to sleep at night, but is sometimes accompanied by nocturnal excitement. Among symptoms due to lesions in the nervous system ocular phenomena take first place. Any or all of the oculomotor nerves may be involved, the paralysis usually being of the nuclear type with conjugate movements affected. Ptosis is extremely common, and helps to add to the appearance of somnolence which is so characteristic. The pupils show a variety of changes, small, dilated, unequal, the Argyll-Robertson type, and failure to react to light or accommodation.

Other cranial nerves may be affected, the commonest being the seventh. The patient may quite early exhibit the Parkinson facies, with characteristic attitude of the arms and hands, rigidity, and, less commonly, tremor. Choreic movements, choreo-athetoid movements myoclonus, and muscular spasm may occur. Epileptic attacks may occur as an initial symptom, during the course of the disease, or as an after-effect; they are not a common symptom in the disease.

One of the most striking sequels is paralysis agitans. Parkinson symptoms may appear early, they may entirely disappear, or pass into a chronic and persisting residual condition. On the other hand cases in which

the patient appears to have made a good recovery may begin many months later to develop the characteristic symptoms of paralysis agitans.

Residual ocular paralysis is common—the degree very variable. Mental changes are also unfortunately very common. The bright child becomes dull, the “easy” child “difficult.” Depression, sometimes amounting to melancholia, is not uncommon. Impulsive tendencies are noticeable in a few cases; one patient always felt the strongest impulse to get in front of express trains, or if water were rushing under a bridge to jump into it, though she had no wish to commit suicide. Disorders of sleep may persist long after the acute stage of the disease is over—somnolent by day, the patients may awake to an excited activity at night.

Severity of onset does not necessarily imply a fatal issue, nor should too optimistic a view be taken with regard to a case of insidious and apparently mild onset.

Statistics of the mortality of the disease have varied from 30 to 50 per cent.—figures which are, of course, quite useless in helping to make a prognosis in any individual case.

With regard to sequelæ, one can say that of the cases which recover perhaps 50 per cent. will have residual symptoms, from some of which, notably the Parkinson syndrome, they may die. Many of these sequelæ no doubt will be slight, and not in themselves disabling. It is important to remember that a case which has made an apparently perfect recovery may develop some sequel at any time in the next two years. After that period I should say the risk was negligible, and the majority of patients show evidence of incomplete recovery within twelve months.

TREATMENT.

There is unfortunately no specific treatment that has proved its value.

The Art and Practice of Medical writing : choice of words.

By GEORGE H. SIMMONS, M.D.,

and

MORRIS FISHBEIN, M.D.

Jl. American Med. Assoc., 1925.

THE use of long, technical words when short, simple words would suffice is a serious fault in scientific literature. Two comparative examples are given, the first from a modern neurologist, the second from the famous essay by James Parkinson on the “Shaking Palsy.”

(1) “There was ataxia in the upper extremities. Diadokokinesis was good in both hands. A suspicion of asynergia was aroused. There was bilateral papilledema. Hypesthesia was present in one arm on the upper extremity.”

(2) “In this stage, the sleep becomes much disturbed. The tremulous motions of the limbs occur during sleep, and augment until they awaken the patient, and frequently with much agitation and alarm. The power of conveying the food to the mouth is at length so much impeded that he is obliged to consent to be fed by others.”

SOLECISMS.

Case.—“Case” is the incidence of a disease, the totality of the symptoms and of the pathologic and other conditions; “patient” is the human being, the man himself. “The case had quite a temperature,” “I put the case to bed,” “The case was taken ill three weeks ago,” “I sent the case out for a walk”—these and similar expressions are found continually in manuscripts; the error nearly always is in using “case” for “patient,” seldom the reverse.

Explore.—The following appeared in a manuscript recently received:—

“It was decided that the patient should be explored with the expectation of finding an acute appendix.”

Ambiguous Pronouns.—An author sometimes refers to himself in one place as “the writer,” in another as “the author,” in a third as “I,” and in still another as “we.” He may then use the pronoun “we” with reference to the medical profession or the public in general, and refer to the writer of some previously cited article as “the author.” Careless use of the personal pronouns makes it impossible to tell when the author is referring to himself and when to some other person. An author should refer to himself in the same terms throughout. The use of the first person singular—I, me—is the clearest and most satisfactory usage. When an author is reporting work done in conjunction with others, it is proper for him to use the pronoun “we,” provided he has stated who are represented by the “we,” so that the reader will not be confused.

Temperature and Fever.—It is incorrect to say that a patient had “no temperature.” “No fever” or “no elevation of temperature” may be used. “Temperature normal,” or “higher than normal” or “subnormal” also are satisfactory. Better still, if the temperature is normal, it should be so stated; if abnormal, it should be given in terms of the Fahrenheit or Centigrade scale.

Medical Jargon.—The peculiar usages of words which have been described are among the most frequent violations of correct use of English terms. There are, in addition, many words that have found their way into medical vocabularies with unusual meanings that are not recognized even by medical dictionaries. Such writings may properly be characterised—as medical jargon or medical slang. When these words appear in medical manuscripts or in medical conversation, they are quite unintelligible to other scientists, particularly those of foreign countries; they are not translatable; they are definitely the mark of the careless and uncultured man.

A number of these terms are given here, with the definition and the correct words following:—

| Jargon | Correct Term |
|--------------------------------|---|
| acute abdomen | acute conditions within the abdomen |
| chronic appendix | chronic appendicitis |
| chronic ear | chronic otitis media |
| collect cases of | collect instances of |
| Dakin's, Dakin's solution | solution of chlorinated soda |
| flu | influenza |
| lues, luetic | syphilis, syphilitic |
| organ or structure is negative | organ or structure is normal |
| pathology | pathologic change, disease |
| prostatic | patient with hypertrophy, inflammation, etc., of prostate |
| serology | changes in the blood |
| sleeping sickness | trypanosomiasis |
| suspicious of | suggestive of |
| specific stomach | syphilis of the stomach |

Preferred Usages.—Among other usages which frequently appear in medical writings, and which, while not incorrect, are susceptible of improvement, are:—

| Word | Preferred Usage |
|------------------------------------|---|
| adrenal | suprarenal |
| amidst, amongst | amid, among |
| apparatuses | apparatus |
| autopsy | necropsy |
| Basedowoid | hyperthyroidism, or term descriptive of the condition |
| Bright's disease | chronic interstitial nephritis |
| cane sugar | sucrose |
| cure | treatment; these two words are not interchangeable |
| enteric fever | typhoid |
| Grave's disease, Basedow's disease | exophthalmic goitre |
| individual | person |
| in extremis | moribund, dying |
| intraspinous | intraspinal |
| microphotograph | photomicrograph |

| Word | Preferred Usage |
|---------------|--|
| milk-sugar | lactose |
| polynuclear | polymorphonuclear, when referring to leucocytes |
| round-celled | round cell |
| sacrificed | killed |
| spotted fever | specify disease meant, such as typhus or cerebro-spinal meningitis |
| x-ray | roentgen ray |
| x-ray picture | roentgenogram |

The Success of the Abortive Treatment of Gonorrhœa.

Lancet, April 18th, 1925.

DR. MARINESCU, lecturer at the University of Bucharest, writes in the *Romania Medicala* that the successful result of abortive treatment of an incipient gonorrhœa depends upon nine conditions: (1) Treatment to follow coitus within 36 hours. (2) Normal incubation. With excessive virulence the incubation is shorter. (3) The urethral orifice not be red, nor swollen, these symptoms being the signs of great virulence. (4) No thick filaments in the urine, thin threads only are permissible. (5) The urine not turbid. (6) The microscopical examination must reveal the presence of extra-cellular gonococci only. (7) The patient must not have treated himself previously, because bad treatment endangers the success of the abortive treatment. (8) Abortive treatment must always be made by the doctor himself and never by the patient. (9) The treatment must be continued for 10 to 12 days. According to Dr. Marinescu, two therapeutic methods deserve our attention: the urethro-vesical irrigations and the urethral irrigations, or both combined. He advocates 10 per cent. argyrol solution. The first lavage serves to wash out the urethra and it has to be let out immediately, the second injection only is retained for 4 to 6 minutes. This has to be repeated 3 or 4 times a day. If the urethra becomes tender during the course of treatment, and the first part of the urine contains purulent filaments, the irrigations have to be applied less frequently. The treatment has to be continued for at least 10 to 12 days, even if the secretion becomes gonococcus-free earlier. The success of the treatment can be promoted by the administration of internal urinary antiseptics and vaccines.

Stovarsol.

Lancet, April 11th, 1925.

Stovarsol is a comparatively new remedy.

In 1922, C. Levaditi and A. Navarro-Martin began to study the spirillicidal action of bodies related to atoxyl and prepared by Fournneau. One of the first of their series was amino-oxy-phenyl arsenite of sodium, or "189." Although this substance possesses marked therapeutic properties, the ratio of the tolerated dose to the curative dose was low, and the investigators prepared a further series of derivatives on similar lines. They found that the acetyl derivative of "189," or stovarsol, possessed much greater curative powers, and the toxic properties were much reduced.

One of the most remarkable properties of stovarsol is that it can be readily absorbed from the alimentary canal. All the curative experiments of Levaditi and Navarro-Martin were conducted by oral administration of the remedy.

In collaboration with other workers it was demonstrated that this drug, taken by the mouth, was able to protect against syphilis. These clinical experiments, of which detailed protocols have been published, were conducted with great care and thoroughness. Thus it was shown that the wives of syphilitics with primary lesions, although fully exposed to infection, could be protected by the oral administration of stovarsol alone:

2 to 4 grams may be given with safety, and the investigators claim that in stovarsol lie the properties of the ideal prophylactic substances. Its value apart from syphilis has been pointed out by many workers. Thus E. Marchaux described its use in lamblia infections and in amœbic dysentery. C. Baermann described cures effected by it in cases of frambœsia.

During the last few weeks two papers upon this question have appeared. M. Petzetakis deals with the use of the drug in amœbic dysentery. His conclusions are instructive. He found that in doses of 0.5 to 1.0 grams by mouth, stovarsol was of the greatest use in the treatment of amœbic dysentery. In the acute stages the remedy could be given with complete safety, and very beneficial results were obtained, as evidenced by a decrease in the number of stools and a diminution of pain, and other clinical manifestations of the conditions. Resistant or chronic cases responded particularly well; and in cases intolerant to emetine and in infants it is regarded by the author as invaluable. He also recommends its use as a prophylactic. These observations of Petzetakis thus supplant the work of Marchaux already quoted. Weiner Worms considers the drug from an experimental point of view. His results of the curative effects of stovarsol upon spirochætal infections in rabbits are not in strict agreement with those of the original investigators. His results are summarised in a series of tables, and the word "nichtigheilt" is applied frequently to rabbits infected with the *Spirochaeta cuniculi*. That the drug possesses marked protective powers Weiner Worms does not deny, but he implies that in order to get complete protection, there is a danger of pushing the drug to toxic limits.

It could hardly be expected that the new remedy would prove to be entirely free from the disadvantage which limited the practical value of its predecessors, the difficulty of finding a dosage adequate for the destruction of the invading organism and yet not toxic to the tissues of the host. However that may be, the convenience of oral administration is so great that the profession will welcome the introduction of this compound. If the results hitherto obtained are substantiated in wider fields there can be no doubt that the drug is a remarkable advance on former products.

Cultivation of Cholera Vibrio from Fæces.

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and

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The Calcutta Medical Journal, Nov. 1924.

In a previous publication on this subject the authors mainly described and proved the advantages of using simple media for the cultivation of cholera vibrio from stool. But a uniform success under all possible conditions is scarcely the experience of a practical worker in this field. As a cholera patient passes from acute to convalescent stage and takes to ordinary food and drink bacterial flora of the gastro-intestinal tract undergoes a profound change. A sample of stool at this stage collected almost aseptically and examined fresh, shows microscopically either very few comma vibrios or none at all; and when such specimens are collected in a soiled bedpan of an Infectious Diseases Hospital and then examined hours after in a Laboratory at a distance, the complexity of the situation increases enormously. But fortunately enough most of the bacteria competing with the cholera vibrios at this stage do not grow on a plate of solid medium more vigorously than the cholera vibrios themselves, and do not produce an appreciable quantity of acid or harmful gas

(N H₂) in a comparatively sugar-free medium as the ordinary agar is.

Hence with a little practice and careful technique it is not at all difficult to obtain a few discrete vibronic colonies on ordinary agar now. But often it happens that the stool at this stage contains quite a good proportion of spreaders which not only outgrow cholera colonies but tend to cut off their oxygen supply by producing quantities of ammonia and thus kill them outright. Isolation of cholera vibrios under such conditions is never possible unless something is used to stop the activities of these spreaders. Aniline dyes or antiseptics will inhibit the spreaders, they will also kill the cholera vibrios. Confronted with this difficulty the authors had to find out something which would not be lethal to vibrios and at the same time would protect them from the inroads of their enemies. In this endeavour they were mainly guided by the biological necessity of the vibrios and their selection of particular sites and environments in the human body for prolonged existence. It was proved by Greig that the gall bladder was the favourite habitat of cholera vibrios, where they would live indefinitely unmolested by other competitors. Bile salt is naturally suggested to be the ingredient which might be useful in artificial culture. They started adding bile-salt (sodium tauro-eholate) to ordinary agar and the result was at once evident. The spreaders were checked and cholera colonies continued to grow on plates; and it is found now that $\frac{1}{2}$ per cent. sodium tauro-eholate added to ordinary agar of pH. 7.6 is quite a workable medium for cholera-cultivation both for direct plating from stool and from septone water culture, and is much preferable to such complicated media as the Dieudonne's and the McConkey's.

The Results of Attempted Rejuvenation.

(From the Vienna Correspondent of the *Lancet*,
March 28th, 1925.)

IN an interesting review covering the whole field and literature pertaining to the problem of sexual rejuvenation by means of surgical interference, Dr. Wilhelm has pointed out emphatically that the original enthusiasm over the boon conferred upon mankind by Professor Steinach and his collaborators has given way to profound silence. Professor Steinach at first believed that in the genital glands there existed two groups of cells or glands distinct as regarded their function. One was the "gland of puberty," which was supposed to be subject to hypertrophy if the other part, the "progenitory gland," was eliminated by ligation of the vas deferens. Several medical men of ripe age, amongst them Professor Zeissl (who died recently in Vienna), underwent this operation and published the results obtained. Professor Romeis is also strongly opposed to the views of Professor Steinach. Professor Zeissl published in the *Wiener Klinische Wochenschrift* an auto-biographical account of the operation and denied absolutely that it had any of the effects of rejuvenation of his own body, as had been claimed by the "youth restorers." In all the cases of rejuvenation of rats, reported by Steinach, Kammerer, and Voronoff, an improvement of the general condition could be observed after the operation, but the effect was only temporary. After some time the old conditions returned, in some instances even there was distinct deterioration. The return or increase of sexual desire and function could not be proved to be other than a psychic one. Professor Leshke, of Berlin, was able to demonstrate that the ageing of human beings was dependent not only on the interstitial substance of the testicles, but also on the other inner secretory glands. When it was finally shown by Harms and Romeis that an old male rat could be made to produce long glossy hair, not only by transplantation of testicles, but also of fragments of liver tissue, it became evident that a large proportion of all the "rejuvenation" symptoms were simply caused

by reabsorption of non-specific products of metabolism from the transplanted material. Also the use of X-rays and of diathermy on the female genital glands, so much in vogue for some time as methods of rejuvenation of the female organism, have become quite obsolete; nor have the original attempts at curing sexual perversion (homosexualism, sadism) by means of transplantation of genital gland tissue been successful. Dr. Lichtenstern reports on 22 cases of such attempts, and is forced to admit that the effect had been rather "overrated." It is therefore questionable whether we are altogether on the right track in trying to obtain a "prolongation of youth" by these means, or whether it is only a faulty technique that is responsible for the unfavourable results.

A New Method of Blood-Letting.

Practitioner, April 1925, p. 310.

C. S. DANZER has worked out a new technique which causes little discomfort to the patient. Two 20-cm. Ricord or Luer syringes are connected by means of rubber tubing with two ends of a three-way stopcock. The third end of the latter is connected by a piece of tubing to the needle, the lumen of which must not be too narrow. The vein is punctured in the usual way, and one syringe is filled. The stopcock is turned so that the other syringe is in series with the needle, and the blood is aspirated into the second syringe. Meanwhile an assistant disconnects the first syringe, empties the blood into a basin of warm water, washes the syringe, and reconnects it. The stopcock is turned back to its original position, so that syringe number one is connected with the needle and blood is again aspirated. Meanwhile syringe number two is emptied of its blood, washed, and connected again. In this way a fairly large quantity of blood can be removed in a few minutes, with practically no discomfort to the patient.—(*Medical Journal and Record* (New York), February 4, 1925, p. 150.)

Food Poisoning.

British Med. J., May 9, 1925, p. 897.

THE Medical Research Council has issued a special report by Dr. W. G. Savage and Mr. Bruce White on food poisoning, founded on a study of 100 recent outbreaks in England.

By far the commonest cause of food poisoning in England is infection of food by living *Salmonella* bacteria or by the toxins of these microbes. *Salmonella* bacteria multiply rapidly in food without causing any obvious decomposition, and they secrete powerful endotoxins capable of resisting temperatures as high as 100° C. In 20 of the 100 outbreaks recorded in this report, living *Salmonella* bacteria were proved to be the agents of infection, and in 14 of these 20 outbreaks *B. aertrycke* was found. The isolation of these bacilli is difficult. In six of these outbreaks the bacilli were only captured from material obtained at postmortem examinations.

Food in which *Salmonella* bacteria have grown may continue to be poisonous after the bacilli themselves have been destroyed, because the toxin is more resistant to heat than the living cells. Food poisoning by toxins of the *Salmonella* bacteria is the most difficult of all to analyse, because ingestion of these toxins leaves no specific stamp upon the body tissues and agglutinins do not appear in the blood serum. Feeding experiments on animals are not often successful, because animals are exceptionally resistant to these toxins. A new method of study is by feeding animals with large quantities, killing the animal nine to twelve hours afterwards, and examining the stomach and intestines for evidence of inflammatory reaction. Another new method is the demonstration of the production of specific agglutinins to the *Salmonella* bacilli through the injection into animals, of suitable emulsions of the

incriminated food. By these methods of investigation the authors of this report have satisfied themselves that 17 out of the 100 outbreaks should be ascribed to *Salmonella* toxins.

Four of the outbreaks were caused by bacteria of the dysentery group which may cause outbreaks of food poisoning indistinguishable in their clinical characters from *Salmonella* infections.

The outbreak of botulism at Loch Maree is dealt with. The responsible food was almost invariably wholesome as judged by sight, taste and smell; tinned food constituted 42 per cent. of the whole. Nearly all the outbreaks from undestroyed bacterial toxin arose from canned food, whereas "made up" meat was much the commonest vehicle for the living bacilli, and milk products for the remainder. Often all who took the incriminated food were affected.

A provisional diagnosis of botulism must be based on symptoms and epidemiological factors; the definite diagnosis is the task of the bacteriologist. The characteristic symptoms are eye disturbances such as double vision; throat symptoms, such as difficulty in swallowing and talking; general muscular weakness. Pain is absent, the cardinal symptoms of *Salmonella* type of infection are not found, constipation rather than diarrhoea is the rule. Fever is rare. Mentality and consciousness are usually clear to the end.

B. botulinus is an anaerobe and the food vehicle must be such as will allow growth in the absence of oxygen. *B. botulinus* is a proteolytic anaerobe, and will originate decomposition changes in the food if it multiplies sufficiently to yield toxin, a feature which distinguishes it from the behaviour of *Salmonella* bacteria which do not cause any evident decomposition. Though the food is altered the changes may be slight, and only detected by an expert. At Loch Maree, they were missed altogether. Owing to the high potency of *B. botulinus* toxin, nearly everyone who partakes of food infected with this organism becomes ill. To the *Salmonella* type of infection some individuals are much more resistant than others, and may escape.

Practically nothing is known at present of the way in which the bacteria of food poisoning get into food. The *Salmonella* bacteria are not present in the normal excreta of man or animals. The germs may have a habitat outside the body, infection may come from a human case or infection may come from an animal source—either from the meat or milk of an infected animal being used for food or due to infection of previously wholesome food with bacilli from an infected animal.

The authors conclude that in the majority of the 100 outbreaks reported the food was originally sound, but became infected with *Salmonella* bacteria from outside sources. The particular channel of contamination in most of the outbreaks remained uncertain.

On the Relative Value of Symptoms and Physical Signs in the Early Diagnosis of Pulmonary Tuberculosis.

This important subject is dealt with in the *Practitioner*, April 1925, by Dr. D. G. Macleod Munro, M.D., M.R.C.P., Deputy Commissioner of Medical Services for Tuberculosis to the Ministry of Pensions.

Some extracts from his valuable paper are given:—

The time is ripe to seek an adjustment of values between the two chief factors in the early diagnosis of pulmonary tuberculosis—namely, the symptomatology and physical signs of the disease at this stage. Hitherto, inspection of the chest has been rather a perfunctory affair and the virtues of palpation limited to vocal fremitus—now regarded as a diagnostic asset of nominal value. Now that special attention is being paid to the muscle reflex, which results in what is known as "lagging," the presence of which especially at an apex strongly suggests active mischief, although percussion and auscultation may give no indication of this, inspection and palpation assume a more important role.

The information conveyed by inspection in these cases may be greatly reinforced by light finger-tip palpation, by means of which evidence of localized reflex muscle spasm especially as affecting the sternomastoid, the scaleni, and the upper pectorals may be detected. The trained finger appreciates in such cases a sense of muscle resistance in contradistinction to the smooth and more elastic sensation of normal muscle tension. Then, too, trophic changes in the muscles of the shoulder girdle and the state of the subcutaneous tissues may be similarly recognized. In the opinion of some experts, indeed, light touch palpation has very largely replaced percussion as an aid to diagnosis. In this connection it must be noted that one may find dystrophy of the shoulder girdle muscles on one side—that on which the disease has been of some standing—and reflex muscle spasm on the opposite side, where the disease is active and more recent.

Percussion to be of any real value must be very light. Local changes in the percussion note, especially at the apex of a lung convey nothing as to the presence of an active tuberculous lesion or indeed, that the lesion, if such exists, is tubercular at all.

Alteration in the percussion note is more significant if found at the left apex, and, further, it is often useful to percuss from below upwards. The value of "respiratory" percussion also must not be overlooked in doubtful cases.

It has often been the case that on finding limited and apparently abnormal signs at an apex or elsewhere, signs indicating some aberration from the so-called normal, we have promptly banished the unfortunate victim to a sanatorium, after which, despite the fact that he may have been non-tuberculous, he is inevitably branded with the stigma of tuberculosis with consequent loss of economic value, not to speak of the serious family disruption occasioned by his course of treatment. I have no hesitation in saying that a by no means insignificant proportion of persons undergoing sanatorium treatment may be found not to be suffering from pulmonary tuberculosis at all.

No physical signs whatever suggestive of pulmonary tuberculosis may have been found after the most careful examination, and yet the disease has declared itself by a sharp hæmoptysis. It may quite well have been that in some of these cases the history and symptomatic evidence had not been given their due importance.

We can affirm that pulmonary tuberculosis cannot be said to be present in an active form without some of the symptoms of toxæmia. It must be noted, however, as will be shown later, that tuberculosis cannot be held responsible for every unexplained toxæmia.

The symptoms may not have been sufficiently obvious to call the patient's attention to the matter at all, and it is just in such cases that the closest scrutiny of the history of the case may furnish just that sufficiency of evidence to turn suspicion into something more tangible. The patient's appetite may have become capricious, or he may have suffered a good deal from flatulence, for which he is unable to account. He may have been having an unaccustomed sense of "tiredness" in the morning, or there may have been recurring headaches, possibly some backache, but not sufficient to indicate to him that he has been febrile.

The symptom-complex of toxæmia is much the same from whatever source of infection it may be derived, the result is shown by such symptoms as malaise and lassitude, nervous instability, tachycardia, fever, and night sweats. This group of symptoms, important though they are, cannot in themselves be regarded as pathognomonic of pulmonary tuberculosis, and other probable causes of infection must be eliminated.

The patient feels more easily tired than usual. Languor is characteristically present in the morning, passing off as the day proceeds, but returning later.

Fever.—The presence of fever is of the greatest value. It has been found that in the majority of healthy persons the average early morning temperature is approximately 97.2° F. to 97.4° F., rising to a maximum

of 98.6° F. in the early afternoon. Some variation beyond these strict limits are met with of course in individual cases, and are often dependent upon certain extraneous factors. If certain simple precautions are taken, oral temperature records are quite trustworthy except in the case of mouth-breathers. The thermometer should be retained in the mouth for at least seven minutes. Temperatures should not be taken immediately after the patient returns indoors, after exposure to cold wind nor after partaking of a hot meal. The maximum temperature period shows great variability in different persons. To ascertain this maximum period with any accuracy in a given case it is necessary to take the temperature every two hours. The first recorded temperature for the day ought not to be, as is often the case, after the patient has got up and dressed, but as early as possible in the morning before rising. Further, it must be remembered that there is a normal diurnal variation in temperature of about 1.5° F. as a result of the natural ebb and flow of the body heat.

In early pulmonary tuberculosis it may be found that the early morning temperature is 98° F. and maximum record for the day 99.2° F. or 99.4° F. A continuous temperature record should extend over three or four weeks in any case of suspected early tuberculosis.

The early morning temperature may also be abnormally low, e.g., 96.8° F., and in such cases a rise from this point to 98.8° F. in the early afternoon must be regarded with suspicion, if occurring regularly and from no known cause.

But assuming that the temperature shows evidence of toxæmia and there are no other definite signs or symptoms to support a diagnosis of pulmonary tuberculosis a further analysis will have to be made to exclude other possible causes. Among these must be mentioned sinusitis, appendicular trouble, tonsillar infections, septic teeth, bronchiectasis and similar localized infections.

In persons of highly strung nervous temperament, there are sometimes quite noticeable variations in the temperature curve.

Dr. Munro attaches much importance to an early morning temperature—taken before rising—which is consistently a little above the average mean. Of additional assistance to diagnosis is the increase of temperature caused by a definite amount of exercise, with a control. In a healthy person there is always a temporary rise in temperature—sometimes a considerable one—after exercise, this is usually quite evanescent and within half-an-hour or so the temperature returns to normal. This is not so in the case of tuberculous persons. The decline of the temperature to normal limits is delayed and it may remain elevated for two or three hours.

The absence of fever does not necessarily rule out the possibility of pulmonary tuberculosis.

Tachycardia, which is of frequent occurrence in early tuberculosis—Fishberg puts it at 90 per cent. of incipient cases—is hardly ever a subjective symptom.

A pulse rate out of all proportion to any febrile condition present is a very common and reliable symptom of early tuberculosis in an active state, and the pulse rate may be notably increased on the slightest excitement or even after a fit of coughing. The increased pulse rate after exercise, falls much more slowly than in health.

Hypotension will be found to be present in a good many cases.

Gastro-Intestinal Symptoms.—Capriciousness of appetite is common, and it is characteristic too of the disease that with a temperature of considerable altitude there is often no loss of appetite, such as is to be noted in more febrile states. The development and persistence of gastritis of varying severity in a young person, without known cause, especially if there be any additional evidence of systemic disturbances, is to be regarded with suspicion.

While progressive loss of weight has considerable significance, it must not be forgotten that there may be

quite noticeable fluctuations in weight up to the age of twenty-five or more.

The group of symptoms covered by the terms *neurasthenia* and *psychasthenia* may be the only evidences of an early pulmonary tuberculosis. These may continue for a number of years, sometimes without any overt signs of pulmonary trouble. Perhaps the most characteristic is languor, and the persistent sense of tiredness, the disinclination to take up any task, and the inability to concentrate on any work undertaken. Sometimes, too, there is marked mental irritability and changefulness of mood. In addition, we may often note headache, fleeting spinal pains, and giddiness. Pain under one or other clavicle is not infrequently complained of, and may be elicited on deep pressure.

Conclusions.—Pulmonary tuberculosis may masquerade as an affection of each of the great systems of the body with no signs or symptoms in any way referable to the lungs. There is no other disease which, very often under the outward guise of ordinary health, can present so protean an array of symptoms often apparently trivial in themselves. Of the several symptoms discussed one only may be present in a given case, or the patient may present the most disconcerting variety of symptoms, each of which has to be tracked to its lair, so to speak. In none of these cases it is assumed can any assistance be rendered by the presence of cough, hæmoptysis, or pleurisy, nor does X-ray examination at this stage yield any useful information. The complement fixation test may or may not be of some assistance.

A diagnosis can sometimes be arrived at long before one could be made by ordinary physical examination of the eliest, and the confirmatory evidence of sputum and X-ray findings make the diagnosis evident to the most casual observer.

Nova et Vetera.

Eighteenth Century Medical Practice in England.

British Med. Jl., May 2nd, 1925, p. 853.

In the Sloane MSS. (4077) there are two letters from Dr. Alban Thomas of Cardigan to Sir Hans Sloane, giving the history of two cases and asking for advice as to treatment.

The second letter runs as follows:

Most Hon'ble Sir,

I have presumed upon the foot of former Acquaintance with your hour to recommend the Case of this Revd. and worthy Gentleman to your perusal, well knowing you to have had more experience than any one of the Faculty now living not only in Cases of this inveterate nature but all others which Humane Bodies are lyable to. Be plased therefore to know that this gentleman is of a pretty gross habit of Body but free as yet from any hydropical Symptoms, of a moist phlegmatick Constitution no way Subject hitherto to any other Inflammatory feavers but the Small-pox which he hath given an Acct of in his Letter to Mr. Gell the Bearer hercof: He is Seorbutick in the highest degree but whether it approaches towards the *Læpra Græcorum* must be determined by your riper Judgement as also whether some preparation from the Viper may not be of use to him together with due Evacuations and a long Continuance of proper Antiscorbutick Alteratives, and your wonted Candour and Humanity will give me leave to acquaint you that I have used the unguentum Citrinum upon such Eruptions with good success in ordinary Constitutions but never without putting them under a Course of Physick for at least Six weeks together first. I heartily rejoyce that you Still, in Spight of Age honourably triumph at the head of the Profession: may you long continue so for the publick good: and I desire you would recollect me to be Your old Sincere friend and most obliged humble Servt.

New Castle in Emlyn

ALBAN THOMAS.

Novr 13, 1738

Sir Hans Sloane's directions for the treatment of this

case, written in Latin in a crabbed hand and much contracted, are preserved with the letter. Dr. F. William Cock has elucidated them. The original runs as follows:—

Venesect. fol anthem. pulv. viper. bezoardici pts h. s. sine theriaca mane cum apozem: sudorific. Elect. lenitiv. pro re nata merc. precipitat. et ag. mincr. purge.

Rendered freely into English the prescription would read:

Bleed the patient. At bedtime let him have a powder made of equal parts of camomile leaves, powder of vipers, and bezoar stone. In the early morning let him have a sweating draught without laudanum. As a laxative, let him take the compound electuary of senna as required. To purge, give mercurial precipitate and mineral water.

Morbidity versus Mortality.

DEATH rates are the usually accepted indications of the unhealthiness of a community, but sickness rates should also be taken into account.

Sydenstricker in the *Public Health Reports of the United States* for February 13th, 1925, deals with this aspect of the question. He dealt with a population group of about 8,500 persons over a period of two years. He found that for every death there were about a hundred cases of sickness, more than half of the illness being due to respiratory diseases.

Diseases of the digestive system were responsible for a sickness rate of 117 per mille while their mortality rate was less than 1 per mille. The diseases against which public health effort is specially directed caused 11 per cent. of all the illness of the community, which was investigated.

Deaths from disease occur chiefly in infancy and old age, but illness is fairly uniformly distributed throughout the whole life.

The author estimates that a million of the wage earners of the United States are off work on each day of the year and that the cost to the country is more than a hundred million pounds yearly. A similar survey for a number of typical communities in India would be of great value: we know in a general way how appalling is the amount of disease and death in India. Accurate figures showing the disease rate and the cost of disease to the community would make the problem more definite and precise and would help to arouse a sense of dissatisfaction with the existing state of affairs.

Tuberculosis.

THE correspondent of the *Journal of the American Medical Association*, in the number for 9th May, 1925, gives an interesting report of the discussion on tuberculosis which took place recently at the Pediatric Society of Berlin.

Professor Bessau of Leipzig holds that there is a specific immunity to tuberculosis, this is not based on antibodies but is related to hypersusceptibility which is in some way associated with certain cells of the body ("tuberculoocytes"). These cells are believed to be formed in response to the stimulus of tuberculin, and the degree of immunity which is developed is proportional to the capacity of the animal to form the tuberculoocytes.

In treatment the aim is to cause mild focal reaction without general reactions. Intravenous injections of tuberculin (apparently any kind) in a dilution of one in one thousand million are capable of causing suitable focal reactions.

Langer of Charlottenburg immunized guinea-pigs by intracutaneous injections of young strains of killed tubercle bacilli and he has employed this method also in young children who give a positive tuberculin reaction six weeks after inoculation.

Professor Engel of Dortmund agrees with the orthodox view that most children get tuberculosis which seldom causes obvious signs of the disease, and which may even cause no discoverable anatomical lesion.

He divides the infection of childhood into two groups:—

(1) Micro-infection or occult tuberculosis with non-discoverable lesion and usually overlooked.

(2) Macro-infections in which there is a discoverable lesion either of the bronchial glands or elsewhere.

Lesions of the bronchial glands often cannot be distinguished by physical examination, even radiographic methods often mislead.

Micro-infections can only be detected by the effect which they have on the sensitiveness of the body to tuberculin, clinical manifestations may be absent or may be indistinguishable from other conditions which cause malnutrition and fever.

The Toxic Factor in Disease, with Special Reference to Chronic Rheumatic Conditions and Diabetes.

By SIR WILLIAM WILLCOX, K.C.I.E., C.B.,

C.M.G., M.D., F.R.C.P.,

Medical Adviser to the Home Office.

Practitioner, May 1925, p. 326.

WE give a few extracts from this very important article:—

The toxic factor as a cause of the symptoms of disease is generally accepted in the case of those diseases of which the specific cause is known.

Diseases where the proof of a specific causal organism is less clearly demonstrable include by far the largest group of diseases, and most of the common ailments come under this category. For example:—

Chronic rheumatic conditions, diabetes, hyperpiesia and arterial disease, various forms of secondary anaemia and possibly pernicious anaemia, many skin diseases, retinitis and many pathological eye conditions, asthma, gout, exophthalmic goitre, colitis, appendicitis, gastric and duodenal ulcer, some diseases of the central nervous system, such as combined sclerosis.

In most of these conditions careful search will reveal some definite toxin, and in many cases a definite focus of bacterial sepsis can be found.

Focal Sepsis.—By this is meant a part of the body in which a definite bacterial infection is present and which acts as a disturbing centre for toxins. Focal sepsis may act as a cause of disease by virtue of the toxins being carried to other parts of the body and setting up a diseased condition by their direct action.

Symbiosis may have an important bearing in determining the type of disease resulting from focal sepsis. Thus the absorption of toxins from an infection of one kind of organism may so lower the resistance of the body that another organism may set up disease. The streptococcal toxæmia of dental sepsis may lead indirectly to the recurrence of staphylococcal infections, such as boils or carbuncles, and removal of the streptococcal focus is often followed by a cure of the recurrent staphylococcal infection.

Sensitization to the toxins from focal sepsis is a most important factor in causation of disease. In this condition the constant stream of toxins flowing into the blood stream so lowers the resistance that disease of a particular type results. Examples of this are to be seen in certain erythematous and recurring urticarial eruptions, in asthma, gout, and angio-neurotic oedema. These conditions are sometimes due to the toxic effects of focal sepsis coupled with a sensitized condition. It is often found in such cases that great hypersensitization exists to a vaccine prepared from the specific focus and in cases of this type vaccine therapy if used at all must be applied with the utmost caution, the initial doses being extremely small.

It seems likely that the occurrence of certain cases of nephritis, and of toxic eye conditions and probably many other diseases of obscure causation, will be explained by the sensitization set up by the toxins of some focus of sepsis.

Chronic rheumatic conditions of non-specific origin include the various forms of fibrositis, such as inflammatory conditions of aponeuroses (muscular rheumatism), tendons and ligaments; panniculitis, bursitis, finger pads, and Heberden's nodes; the various forms of arthritis, perineuritis occurring as sciatica, brachial neuritis, etc., are common examples.

"Chronic rheumatism" is probably the commonest disease at the present day, and it heads the list of incapacitating diseases as judged by the National Health Insurance statistics. The most important aetiological factor in chronic rheumatic conditions is probably the toxic factor. In almost all cases careful search will reveal some focus of infection. In most cases the organisms present in the focus of infection will be streptococci usually belonging to the viridan group. It cannot be too strongly appreciated that chronic rheumatic conditions are not a primary disease but simply one group of manifestations of a toxæmia usually of streptococcal origin.

In every case of "chronic rheumatism" careful search should be made for a focus of infection. Dental sepsis is the commonest cause, and a clinical examination of the teeth should be supplemented by careful radiographic examination. The tonsil, naso-pharynx, maxillary, antra and accessory sinuses should be carefully examined. Bacteriological examinations of the stools and colon washings and of the urine should be carried out. Evidence of an infection with streptococci of the viridin group is almost always found.

Infected teeth should be removed, and this is most essential in those showing apical infection. Tonsils if badly infected should be enucleated under proper surgical safeguards, unless their condition is such that medical treatment is likely to be followed by removal of the focus of infection. Infected antra will require surgical treatment. Where evidence of colon infection is present, either from clinical or bacteriological examination, colon lavage is of value. The presence of colon toxæmia is usually shown by a marked excess of indican in the urine, and it is most important that this test should be applied in cases of chronic rheumatism. Where the rheumatic condition is of long standing vaccine treatment is advisable, but only when the focal sepsis has been adequately dealt with. The best results are obtained with combined vaccine made from the several foci of infection.

It is important to remember that in most cases where a primary infection occurs in the teeth or naso-pharynx, the colon becomes secondarily infected. It is therefore generally advisable that pathogenic streptococci from the colon should accompany the streptococci from the teeth or tonsils. A convenient strength of vaccine is fifty millions combined streptococci per c.cm., but in cases where there are symptoms of severe toxæmia a strength much less than this, e.g., from one to five millions per c.cm., should be used at first.

In Sir William's hospital practice the routine treatment in arthritis is as follows:—

Guaiacon carbonate, grains 10 three times daily, and to this a few grains of aceto-salicylic acid are added with each dose if much pain be present.

Also tincture of iodine (French Pharmacopœia, without potassium iodide) m.v. in a wineglassful of milk or water, three times daily, after meals, is given, the dose being increased to 6 or 8 minims.

Local treatment of the affected parts by hot applications such as iodine poultices, radiant heat, ionization or diathermy is advisable. In chronic cases of arthritis the rubbing in of an ointment composed of Scott's dressing diluted with two or three parts of lanoline is very helpful, and this may be applied night and morning, the joint being covered by a bandage.

Infection as a Cause of Diabetes.—It is well-known that severe glycosuria may result from the toxæmia of acute infections.

It is an established fact that the internal secretory cells in the islands of Langerhans are susceptible to toxic influences, and, in every case of diabetes, careful search should be made for chronic infections resulting from focal sepsis.

Any focal sepsis should be dealt with at this stage by appropriate surgical measures. After the preliminary treatment of the diabetes has been successfully carried out and the patient is free from glycosuria and acetoneuria, there is no risk in the administration of an anæsthetic for the surgical treatment of the focal sepsis. Local anæsthesia, or general anæsthesia with gas, or gas and oxygen, or ether, may be given. Chloroform should not be administered to diabetic patients owing to its toxic effects.

The removal of focal sepsis is usually followed by an immediate transient fall in the carbohydrate tolerance, and glycosuria frequently recurs. This is due not to the effect of the anæsthetic but to the auto-inoculation resulting from the operation. After the removal of focal sepsis in a few days the carbohydrate tolerance usually rises to a figure considerably higher than that before operation. In some cases the rise has been so pronounced that the carbohydrate tolerance has risen to a figure approaching the normal and further treatment has been unnecessary.

In cases of focal sepsis of long duration, it is probable that great damage to the pancreas has already occurred, so that great recovery in the carbohydrate tolerance cannot be expected. The removal of the focal infection is, however, a safeguard against further pancreatic damage, and is almost always followed by some rise in the carbohydrate tolerance.

The principle underlying the treatment of the above conditions should be based on the removal or minimising of the causal toxæmia. Other methods of treatment, such as local treatment in rheumatic conditions, dietetic and insulin treatment in diabetes are of great importance and should supplement that of the causal toxæmia.

Reviews.

THE TECHNIC OF LOCAL ANÆSTHESIA.—By Arthur E. Hertzler, A.M., M.D., Ph.D., LL.D., F.A.C.S. Third Edition. St. Louis: The C. V. Mosby Company, 1925. Pp. 272, with 140 illustrations. Price, \$5.50.

THE author of this book is best known to English readers for his work on the thyroid gland in which he records his practice and observations in.... "a small country hospital." Possibly it is the limitations of such a hospital that has led to his extensive use of local anæsthesia. Be that as it may, there is no doubt that the conditions prevailing in most Indian hospitals are such as to call for a more extended use of local anæsthesia. Trained anæsthetists are few and far between and even among these it is rare to find one capable of giving open ether. Chloroform, owing to the danger of decomposition in a hot climate, is more dangerous than in a temperate one. Local anæsthesia has therefore a wider field of application than in other countries.

In this volume we find the necessary guidance, based on experience, to enable any surgeon to pick out those cases where local anæsthesia is the method of choice, and those where it is possible when general anæsthesia is contraindicated or not available. The instructions are so clear and defined that there can be little excuse for making vast demands on the patient's fortitude. The limitations of this procedure are described as fully as its possibilities. We feel that this book is not written by a wild enthusiast for local anæsthesia, but by an experienced surgeon who selects his methods, solely guided by the interests of his patient.

The book opens with a brief description and criticism of drugs available, followed by a general description of the technic of administration. The chief characteristic of the latter is its simplicity and absence of special apparatus. A brief description of general operations is followed by a series of chapters devoted to regions and the operations pertaining thereto. Each chapter opens with the neural anatomy of the region, followed by detailed instructions for each operation performed in that particular area. Thus a typical chapter is that on operations of the face, jaw and tongue. After a general discussion of the problems peculiar to this region, several pages are devoted to the neural anatomy with illustrations of the fifth nerve and its branches. Then come instructions for operations on the orbit, frontal sinus, soft parts of the face, upper jaw, extraction of teeth, tumours of alveolar process, infections of the antrum, resection of the jaw, operations on lower jaw, tumours of the lower jaw, excision of cervical lymph glands, excision of the jaw, operations on the tongue and tumours of the floor of the mouth, buccal soft parts and lips.

There are seventeen chapters of this type so that the ground is amply covered.

The chapter on abdominal operations includes wise advice when to abandon local anaesthesia and substitute general and also when to combine the two. The author definitely sets himself against anything in the nature of "stunts." His descriptions include a new method of injecting the gasserian ganglion. There is also a chapter on sacral blocking paravertebral and spinal anaesthesia. He only admits one indication for paravertebral blocking, namely operations on the thoracic oesophagus. Anywhere else it is a "stunt."

We learn that to do a radical mastoid under local anaesthesia requires "plenty of time and the enthusiasm of youth."

The book is eminently readable because of the author's easy style and somewhat caustic wit. For example, in condemning a special chair for paravertebral blocking devised by an enthusiast he remarks "Looking at the chair one would think it was designed for the cure of chronic constipation. The patients in whom I have used paravertebral anaesthesia have been too sick to sit up and their bellies too sore to make it possible for them to imitate the shivering dog."

We do not know any book giving sounder advice and clearer instructions. We confidently recommend it to all interested in the subject. The printing, illustrations and binding are typical of the best American publications, but there are several printer's errors which we trust will be rectified in the next edition.

FORENSIC MEDICINE.—By Sydney Smith, M.D., D.P.H., Principal Medico-legal Expert, Egyptian Government Service; and Professor of Forensic Medicine in the Royal School of Medicine and Law, Cairo. London: J. & A. Churchill, 1925. Pp. 498, with 117 illustrations. Price 21s. net.

COMPARATIVELY few works on forensic medicine have appeared since the publication of Taylor's "Manual of Medical Jurisprudence" in 1844.

The appearance of a new text-book on the subject by an experienced teacher is therefore specially welcome. The book throughout bears the stamp of the author's experience and original study.

The distinctive feature of the book is its pointedness. The reader learns at once what to look for, where to look for it and how to assess the value of appearances as evidence. The author's large experience has enabled him to reassess, in the book, the relative value of time-honoured appearances, as evidence, and to assign them their proper places in the light of such experience. Further contribution of an original and practical nature from the author's investigations have materially contributed to the value of chapters on wounds, injuries, violent deaths, sexual offences and infanticide.

Much original matter and many practical hints will be found in these chapters. Students and practitioners in India would find it necessary to supplement their reading, by knowledge concern-

ing medico-legal matters peculiar to the country, from books on the subject, but apart from this the book may be safely recommended as an up-to-date treatise on forensic medicine. The book is concisely written and excellently illustrated. The book would be found particularly valuable by those whose duty involves the sifting of medico-legal evidence and the giving of evidence in court.

THE INHERITANCE OF MENTAL DISEASES.—By Abraham Myerson. Baltimore: Williams & Wilkins Co., 1925. English Agents: Messrs. Balliere, Tindall & Cox, London. Pp. 336. Price, 25s. net.

THIS book appeals to a wide field of readers and workers. The educationalist, the psychiatrist, the economist, and all those interested in the health and welfare of their community will find in it much food for thought. Even though they find they cannot concur in all the views propounded by the author, they will gain much benefit and useful knowledge from a perusal of his work, new views will be brought to their notice, new light thrown upon old ones.

The manner in which the term "insanity" is discussed in chapter I is delightful reading and should be an eye-opener to many and bring them to a very different opinion regarding mental diseases from that they hold at present when they class them all under the one generic term "insanity."

In chapter III he still further develops his thesis grouping mental diseases on what he terms a "biological and logical basis. The phrase is a happy one and in his hands the theme is admirably developed and teems with information. The rest of part I is devoted to a discussion of the psychoneuroses and epilepsy, feeble-mindedness and certain mental diseases.

In part II, we attain at last to the main object of the book and justify its title. Here the reader is confronted with a huge number of statistics and records of families which provide most interesting and informative reading when taken in conjunction with the author's summaries. On the whole he brings forth much evidence in support of his statement that there is a possibility that mental diseases are caused by unknown environmental agents whose effects persist over two or more generations and from which a stock may die or recover.

Finally the larger problem that is involved by the issue of heredity or disease is dealt with. Here the author plumps whole-heartedly for disease as opposed to heredity and opposes strenuously the doctrines of eugenicists who condemn hygiene as being bad for the stock. He considers adverse environmental conditions to be very much more responsible than is generally supposed for conditions now usually considered to be due to heredity and claims that if his views be correct then hygiene is the salvation of all nations and eugenicists naught but false prophets whose doctrines but hasten a nation's progress on the path to destruction, as by accepting them hygiene is indicted and efforts to eliminate adverse environmental conditions are diminished, even if they do not wholly cease.

It is a book that cannot be taken up and skimmed through. It must be read at leisure and each part one is attempted. The reader will gain a fund of information from his perusal of its pages and much food for thought on the new aspect of the inheritance of mental diseases.

SURGICAL OPERATIONS. A TEXT-BOOK FOR NURSES.—By E. W. Hey Groves, M.D., B.Sc., M.S., F.R.C.S. Second Edition. London: Oxford University Press. Pp. 255. Price, 21s. net.

THAT a second edition of this excellent little work should have been called for so soon after the appearance of the first edition is not surprising in view of the admirable fashion in which it serves the purpose for which it was designed.

Although principally intended for the use of nurses the book will repay the student who is commencing his clinical studies the trouble of reading it.

In the first chapter the general organisation of the operating unit is discussed with special reference to the all-important subject of sterilisation. This section is clearly and briefly written; more stress might perhaps be laid on the danger of overloading the steriliser drums.

It cannot be too often repeated that though the temperature at the outside of the drum may be and often is 121°C ., that at the centre of the drum may be only 95°C .

The use of a mixture of methylene-blue and anti-febrin in a proportion of 2 grains to 1 ounce is recommended as a safeguard; the mixture is said to remain white up to a temperature of 230°F . The reviewer has tried this and found it highly unreliable. In any case it must be placed in sealed glass tubes.

The remainder of the book is devoted to a brief account of all the common operations of surgery, the instruments used and the technique employed together with a short account of the indications for operation.

The book ends with an illustrated catalogue of the common instruments in use at the present day.

The illustrations are numerous and admirably clear, the style simple and lucid, as we should have expected in the case of a work by a master-craftsman writing about his own art.

OPERATIVE SURGERY.—By J. Shelton Horsley, M.D., F.A.C.S. Second Edition. St. Louis: The C. V. Mosby Co., 1924. Pp. 784, with 666 original illustrations. Price, \$12.50.

In the great majority of books on operative surgery all the known methods are described and but little attempt is made clearly to indicate the best method according to the experience of the author.

In this book which covers the whole range of operative surgery, exclusive of gynaecology, Dr. Horsley only describes in detail the techniques, which in view of his experience he deems best, thus considerably increasing the value of the work as a guide to the inexperienced surgeon.

Throughout he insists that in extirpating or correcting pathological conditions one should always keep in view the restoration of the physiology of the tissues or organs, and this principle is very apparent in the method of pyloroplasty which he has devised.

In chapter 2 he discusses surgical drainage and states that as a result of the irritation of the drainage material there is a reversal of the local lymph circulation with outpouring of serum.

The chapters on aneurisms and suturing of blood vessels are particularly clear and well illustrated.

Quite an unusual feature of this work is a chapter devoted to the principles underlying operations for malignant tumours.

The following new operations are incorporated in the text:—The lymphaticostomy of Costain for diffuse septic peritonitis, Stookey's operation for innervating paralysed muscles, Finney's pylorotomy, Graham's pulmonary lobectomy, Cutler's valvotomy for mitral stenosis, the operation for angina pectoris of Coffing and Brown, the chordotomy of Frazier, and Kerr's intestinal resection.

We cannot criticise, but can only admire, welcome, and recommend the second edition of this interesting book by so thoughtful and experienced a surgeon.

The book is beautifully illustrated and the type large and clear.

THE PRACTICAL MEDICINE SERIES. Vol. 2. GENERAL SURGERY.—Edited by A. J. Ochsner, M.D., F.R.M.S., LL.D., F.A.C.S., F.R.C.S., Jr. (Hon.). Series 1924. Chicago: The Year Book Publishers. Pp. 706. Price, \$3.00.

A VERY comprehensive review of the past year's important literature of clinical surgery under the

distinguished editorship of the President of the American College of Surgeons.

There is a very interesting address on acute osteomyelitis by Dr. Ochsner, in which he stresses the importance of early diagnosis, and recommends early free incision of the periosteum combined with a moist boric acid alcohol dressing with an electric light over it to ensure warmth. He condemns the practice of chiselling away bone in the acute cases, as it produces necrosis of good bone and spreads the infection, and he maintains that simple free incision of the periosteum is all that is necessary in the primary treatment, as it changes the direction of the lymph stream with a consequent outpouring of lymph in the dressings.

He mentions a very instructive case in which by simply incising the periosteum he was able to save a metatarsal bone which was black from end to end without the formation of any sequestrum.

In the section on anaesthetics Keates states that he has never used or seen used any other general anaesthetic but chloroform, and that open ether would be out of the question in the hot weather in India.

We would like to correct the impression that ether is not used in India, as for the past two years it has been the general anaesthetic used throughout the year, by the open method, at the Presidency General Hospital, Calcutta.

Of great interest to surgeons in India are the statistics quoted by Walton on the effect of heat on operations for exophthalmic goitre. He states that from statistics of over ten years, the operative mortality in the summer months of June, July and August, was 20 per cent., as against a nil mortality in the colder months.

The review of general abdominal surgery occupies 260 pages and is very full of interesting work.

A book of this kind helps the busy surgeon to keep in touch with the most recent literature on surgery.

HANDBOOK OF OPERATIVE SURGERY.—By Sir William Ireland de C. Wheeler (Mod.), B.A., M.D. (Dub. Univ.), F.R.C.S.I., F.A.C.S. (Hon.). Fourth Edition. London: Baillière, Tindall & Cox, 1925. Pp. xvi plus 441, with 298 figs. Price, 15s. net.

THIS is a book of modest dimensions essentially for the use of students preparing for their final examinations.

There is an excellent chapter on local anaesthesia, and this is followed by short descriptions of the author's method of preparing a patient for operation and his routine treatment afterwards.

The descriptions of the various operations are good.

The illustrations are good, and the whole arrangement of the book is pleasing.

That a fourth edition has been reached is sufficient evidence that a place has been found for it in the student's ever increasing library, and there can be no doubt that it will prove extremely useful to those for whom it is intended.

A SYNOPSIS OF GYNÆCOLOGY.—By A. Gray, F.R.C.S., M.R.C.P. London: Edward Arnold & Co., 1925. Pp. 352. Price, 10s. 6d. net.

THE hand of the tutor can be seen all through Dr. Gray's "Synopsis of Gynaecology." Every point is arranged under headings with clearness and brevity. Important and common conditions such as fibroids of the uterus, carcinoma of the cervix and body, tubal gestation, and salpingitis are dealt with excellently. There are several attractive features.

We note with pleasure the chapter on the functions and dys-functions of endocrine glands in relation to gynaecology, and his statement regarding extract of thyroid gland. "It is the only ductless gland the extract of which supplies a true replacement for defective secretion. It is the only gland which used to be a duct gland discharging its secretion by the thyroglossal duct into the alimentary canal." This verdict may help to limit the sale of that machine-gun—erratic and uncertain—polyglandular extract.

Another very valuable chapter is that on forensic gynaecology, wherein the reader is shown clearly his duties and responsibilities to his patient and to the state and also the present state of the laws on the subject.

Our chief criticism is the size of the book. It seems a pity to include in a work, intended chiefly as a help to the already overburdened student, conditions which are described as being "all so rare as to be pathological curiosities" (vide, p. 198). There are three hundred and forty pages of highly condensed material and these do not include descriptions of operations.

If it were briefer it would be a more valuable aid to those studying for higher examinations and also as a means of refreshing the memory of teachers.

The book is well turned out and the printing excellent.

SURGICAL TREATMENT OF PULMONARY AND PLEURAL TUBERCULOSIS.—By J. GRAVESEN, M.D. (Copenhagen), with a foreword by S. Vere Pearson, M.D., M.R.C.P., Resident Physician, Mundesley Sanatorium. London: John Bate, Sons & Danielsson, Ltd., 1925. Pp. 155, with 87 illustrations (3 in colour). Price, 10s. 6d. net.

The work opens with a preface by the author followed by a "foreword" by Dr. Pearson. One pauses to enquire when this most exasperating manifestation of Saxonism will be finally consigned to the literary rubbish heap. "Foreword" may be Saxon, it certainly isn't English.

A better title for the work would perhaps have been "Collapse Therapy," as the surgical procedures dealt with in the book aim at securing collapse of the affected lung.

The author in his preface modestly disclaims any credit for originality and affirms that he is merely carrying out the work of his distinguished predecessor, the late Professor Christian Saugman.

The experiences and conclusions are exclusively based on clinical work accomplished at the Vejleffjord Sanatorium, without reference to the work or figures of others. This has resulted in a gain to the work in clearness and brevity because in the author's words "the literature of the subject has become like an avalanche," and the author's object is to give a working plan of treatment.

The surgical procedures discussed are artificial pneumothorax, extra-pleural thoracoplasty, apicectomy and phrenicotomy. Very full practical details are given in the section dealing with technique, and a well-timed warning as to the dangers of introducing air into the pulmonary circulation, with the almost inevitable sequel of death from air embolus in the brain or one of the branches of the coronary artery.

The last part of the book deals with the application of the foregoing measures to pleural tuberculosis combined with chemo-therapy.

In short, a very stimulating and suggestive work, and well worth perusal by all practitioners in this country whose work may bring them in contact with a class of case which is too often regarded as hopeless.

AN INTRODUCTION TO DERMATOLOGY.—By Sir Norman Walker. Eighth Edition. Edinburgh: W. Green & Son, Ltd., 1925. Pp. 373, with 92 plates and 80 illustrations. Obtainable from Messrs. Butterworth & Co. (India), Ltd., Post Box 251, Calcutta. Price, Rs. 15 net.

SKIN diseases to a very large percentage of medical practitioners are a matter of chronic irritation. The first symptoms of this irritation commence about a week before their final examinations when they make the discovery that they know nothing whatsoever about skin and that in any case they are likely to get something about "skins" in their 'viva'; they therefore rush to the skin out-patient department only to have a whole afternoon wasted by a gentleman who has found a patient suffering from some very rare skin disease about the

ætiology of which he holds some very decided views, views which he shares with very few other people and certainly not with the examiner whom they are going to meet in a week's time. In desperation a recently passed friend is consulted; he is inclined to be cynical and optimistic, as most recently qualified men are, and replies, "You won't get a skin question this year; in any case you know that skin diseases are divided into two classes, those that react to zinc ointment locally and arsenic internally and those that don't; the first are cured by this treatment, the others are incurable. Well, I must be off, I hope you get through." This irritation, commencing thus in their early twenties lasts the greater part of their medical careers. They are told that Mrs. Jones' little boy's "eczema" which had resisted all their prescribing ingenuity has disappeared in 48 hours after the application of Jam Nink, that well advertised ointment; they are also told what Mrs. Jones thinks of doctors in general and of them in particular.

I do not claim to be able to prescribe a specific for this complaint but if your time as a student was too full to allow a regular attendance at the skin clinic then the purchase of a sound and well illustrated handbook on dermatology will certainly help to allay the irritation. For this purpose the book under review could hardly be improved upon. It is a short book (373 pages), written in a very pleasant style dealing concisely but at the same time completely with all the common skin diseases that one meets in everyday practice in England and, with some exceptions, in India. Above all it is very well illustrated; there are 92 full page plates, mostly coloured, and about the same number of text illustrations. We can thoroughly recommend the book both to the student and to the practitioner.

TUMOURS AND CANCERS.—By Hastings Gifford, F.R.C.S. London: Selwyn & Blount, Ltd., 1925. Pp. 703. Price, £2-2-0 net.

THIS is a biological study of tumours and malignant growths, replete with information and interest.

The work is divided into books or sections which deal with growth as instanced in plants and animals, with the development, origin, nature and natural history, cure and prevention of cancer.

The literature consulted in connection with the subjects discussed in the various sections is very extensive.

The general conclusions arrived at are of particular interest, especially those concerning the causation of cancer, wherein the author is inclined largely to incriminate the conditions of modern civilised life.

There is much to be said for the contention that retrograde influences are active "weakening the whole fabric of the most civilised nations."

The work is one which may be read with great interest by all concerned, either directly or indirectly, with the immense problem which we have to face in malignant disease.

POST-GRADUATE LECTURES. Vol. II. CANCER.—Edited by H. J. Patorson, C.B.E., F.R.C.S. London: John Bale, Sons & Danielsson, Ltd., 1925. Pp. 186, with 15 plates (43 figs.). Price, 12s. 6d. net.

THIS is a series of lectures dealing with the pathology and treatment of cancer occurring in various organs of the human body.

The first two lectures, one by Sir Thomas Horder and the other by Archibald Leitch, deal in a general way with the subject and do so in a very interesting manner.

Leitch gives it as his opinion, one strongly supported recently by Ewing, that frozen sections of pieces of tumours made rapidly during the course of an operation are of less value in diagnosis than a careful macroscopical examination of the tumour. With this conclusion there can be little dispute.

The remaining lectures, on cancer of the larynx by Sir St. Clair Thomson, carcinoma of the œsophagus by H. S. Souttar, cancer of the breast by Sampson Handley, cancer of the stomach by the Editor, cancer

of the uterus by Victor Bonney, cancer of the intestines by C. A. R. Nitch, malignant tumours of the kidney by R. H. J. Swan, of the bladder by Swift Joly, and of the rectum by W. E. Miles, are of great value and interest both in their pathological and clinical aspects.

As noted by the Editor, the lectures are given as delivered, in spite of the fact that there are occasional divergences of opinion. For example Leitch says that "it is unsafe to argue that the mammary gland in chronic mastitis is any more liable to become cancerous than the apparently normal breast," while Sampson Handley in his lecture remarks that "chronic mastitis is undoubtedly—and in my opinion beyond controversy—one of the predisposing causes of malignant disease."

The Editor leaves it to the reader to decide "what is truth," and in this case we concur with the surgeon.

These lectures, ably composed, and presented in a well produced and illustrated volume, are worth study by both pathologists and clinicians.

PHYSIOLOGY OF THE CENTRAL NERVOUS SYSTEM AND SPECIAL SENSES.—By N. J. Vazifdar, L.M. & S., F.C.S., F.C.P.S. Fourth Edition. Bombay: S. Govind & Co., 1925. Pp. 238, with 26 illustrations. Price, Rs. 4-8-0.

THE first edition of Dr. Vazifdar's "Physiology of the Central Nervous System and Special Senses" was published in 1911 and the fourth edition has now appeared.

The book is intended for students of physiology preparing for the medical degree examination. The fact that it is compiled from the best known text-books on the subject—Halliburton's "Handbook of Physiology," Howell's "Text-book of Physiology," Schäfer's "Essentials of Histology," Stewart's "Handbook of Physiology," Starling's "Principles of Human Physiology," Short's "New Physiology in Surgical and General Practice," etc., is sufficient guarantee of the quality of the contents. Being a resumé the book is useful to students and practitioners for revision and reference purposes. There are numerous diagrams and tabular statements which help not only in grasping the facts, but in remembering them. The popularity of the book is well deserved.

HEALTH AND PSYCHOLOGY OF THE CHILD.—Edited by Elizabeth Sloan Chesser, M.D. London: William Heinemann (Medical Books), Ltd., 1925. Pp. 302. Price, 7s. 6d. net.

MODERN psychology is prolific nowadays in new publications. This book, however, is a new departure in that it appeals to those who have the physical and mental welfare of the child at heart. To parents, teachers, members of the medical profession and all religious instructors it is a highly commendable book, as its several chapters have all the stamp of authority, being written by men and women whose names recall to one's mind the subject with which they deal. Tredgold devotes a chapter on delinquency in children; Leonard Williams on the endocrine glands and vitamins; Lady Baden-Powell on the value of training; Percy Hall on the value of sunlight on children; Viscountess Erleigh on mothercraft, etc. The book is "all-embracing" in its handling of the subject, and as a perusal of its contents will indicate, the subject is approached from many standpoints.

In a chapter on "the physical aspects of adolescence" by Sir Bruce Bruce-Porter, the following occurs:—"There is no doubt the nations of the world who are the most powerful in physique and peaceful in mind are the non-meat eating races and so in the animal world. The animals that do the heavy work are cereal feeders, while the nervous nations and nervous animals are the carnivorous." I believe many distinguished medical men, such as Lieut.-Col. McCay, Lieut.-Col. McCarrison, I.M.S., and Professor Mellanby of Sheffield would dispute such a statement.

Again he states "..... even cancer may be traced to this chronic poisoning (neglect of the bowel)".

This very probable hypothesis regarding the cause of cancer cannot, I believe, be accepted as a scientific fact.

As an introduction to the study of mental phenomena by analytical or psycho-analytical means the study of the child mind is undoubtedly the simplest. This book is therefore commended to all those who have a baby or children to experiment with, and a highly interesting experiment it is bound to be if the thoughts expressed and the principles laid down are taken to heart.

THE CEREBRO-SPINAL FLUID IN CLINICAL DIAGNOSIS.—By J. Godwin Greenfield, M.D., B.Sc., M.R.C.P. and E. A. Carmichael, M.B., Ch.B. London: Macmillan & Co., Ltd., 1925. Pp. 272. Price, 12s. net.

THIS is a comprehensive and well arranged work dealing with the characters, normal and abnormal, of the cerebro-spinal fluid, and with its anatomical and physiological relationships.

There are also sections detailing the alterations encountered in certain diseases, and the technique employed in various methods of examination.

The authors write with the authority of their special experience in the National Hospital for the Paralysed and Epileptic in London and have produced a valuable work of reference for physicians and laboratory workers.

A good list of references to books and special articles is included.

"BILHARZIA: A PAPER FOR THE PRACTITIONER.—By F. Gordon Cawston, M.D. (Cantab.). London: John Bale, Sons & Danielsson, Ltd., 1925. Pp. 20. Price, 2s. 6d. net.

THIS little booklet, which is a reprint from a paper in the *Journal of Tropical Medicine and Hygiene*, gives a brief account of Bilharzia disease as it occurs in South Africa, laying particular emphasis on the points which are of interest to the general practitioner.

After a few preliminary pages on the occurrence of the disease, the method of infection and the life cycle of the parasite, the author briefly describes the principal symptoms and pathological conditions associated with the disease, and then devotes most of the remaining half of the article to treatment. Only one course of treatment is described, and the details of the technique are made almost childishly simple, so that any practitioner, however inexperienced, could hardly make a mistake if he followed directions. If one is to judge the technical ability of the practitioners for whom the book is written by the completeness of these instructions then it would seem that the short paragraph on the complement-fixation test which follows is so inadequate as to be practically worthless. For these readers, also, it seems that a more thorough description of the ova and method of recognising them, even at the expense of some of the description of the cercariae, would have been useful.

PREPARATION OF SCIENTIFIC AND TECHNICAL PAPERS.—By Sam F. Trelease and Emma Sarepta Yule. Baltimore: Williams & Wilkins Co., 1925. English Agents: Messrs. Baillière, Tindall & Cox, London. Pp. 113. Price, 7s. 6d. net.

THIS book was written for the benefit of the senior student and the scientist who has had little practice in putting the result of his work on paper. If it were compulsory for every contributor to a scientific journal to read a book such as the one under review, much of the editors' time would be saved. The book was not written particularly for the medical man but the advice given is almost all applicable to papers on medical subjects. An attempt is made to show the reader how he should put his ideas on paper, how he should arrange them in the form of a balanced paper and how he should rearrange his paper and correct his mistakes.

SEPT., 1925.]

Valuable information on the use and abuse of capital letters and italics is given. There is a section on the methods of literature citations, or references; this section occupies nearly a quarter of the whole book and goes into the matter very thoroughly. Three different methods are given. It is not very apparent what difference exists between the second and third method and the methods are not criticised. The third method is, I think, the one which is generally accepted as being the most practical. A list of abbreviations for well-known journals is given. This list is very incomplete. I feel that it would have been better to have made the list more complete, even if this meant a considerable increase in the size of the volume, or, as an alternative, a short discussion on the principles which govern these abbreviations would have been more useful than an incomplete list. The section on proof reading is disappointing; the suggestion that proofs should be read through three times being compared line by line with the original is not very helpful. Mistakes are much more likely to be noticed if the paper is read through slowly and intelligently, reference only being made to the original in the case of figures. The line-for-line method might be followed for the first reading only, especially when the proof reader is unfamiliar with the subject-matter of the paper. A few useful hints about the common tricks of compositors would have been useful; for example, if a letter is missing from a word, there is usually a very fair chance that the missing letter will be found in an inappropriate place in the next line.

There is much valuable information in the book but there is much that has been left out. I cannot help feeling that we have not quite received our money's worth.

ELEMENTARY ANATOMY AND PHYSIOLOGY FOR NURSES.—By H. Clifford Barclay, M.B., Ch.B., M.R.C.S., L.R.C.P., F.R.C.S.E. Third Edition. London: Baillière, Tindall & Cox, 1924. Pp. x plus 411, with 49 figs. in the text. Price, 12s. net.

This book is an honest attempt to make anatomy and physiology interesting and intelligible for nurses during their training. We cannot but feel, however, that the text is too discursive, and that the chapters on embryology, comparative anatomy, psychology, and the emotions are more than the average nurse can be expected to assimilate.

CHININUM.—Presented by Bureau tot Bevordering van het Klinie Gebruik, 48 De Wittenkade, Amsterdam.

This little book, designed to popularise the use of quinine in various conditions apart from malaria, is a collection of articles by various authors on the administration and value of quinine in certain diseases.

It also contains a series of 24 heliotypes on cinchona culture in Java.

In an early chapter the action of quinine is lucidly described by Professor H. Kionka, of the University of Jena. This section is well worth reading by the pharmacologist as well as the practising physician.

It should be a work of great interest to the student and practitioner of medicine as it brings home to one that the medicinal uses of quinine are not confined to its use in malaria.

AN AFRICAN HOLIDAY.—By Richard L. Sutton, M.D., LL.D. St. Louis: The C. V. Mosby Co., 1924. Pp. 180, with 102 illustrations. Price, \$2.25.

This little book is a fascinating story of the author's experiences in Africa shooting big game. It is clearly and simply written and fully illustrated with actual photographs. It will appeal to all sportsmen and lovers of Nature.

Annual Reports.

ANNUAL REPORT ON THE JAIPUR MEDICAL INSTITUTIONS FOR 1923. BY DALJANG SINGH KHANKA, M.B., RAI BAHADUR. SUPERINTENDENT OF DISPENSARIES AND VACCINATION, JAIPUR.

THERE were 2,982 births as against 4,122 deaths in Jaipur city during the year, but the actual death rate, 34.28 per mille, is very similar to that of most Indian towns. More than half the mortality occurred among children of less than five years of age. Small-pox was mildly epidemic during the year and caused 106 deaths, December being the month in which the incidence was greatest. From September to December Jaipur was stricken with dengue, and five emergency sub-assistant surgeons were specially deputed to go round their circles morning and evening, treating cases and issuing instructions for anti-mosquito measures. Plague, influenza and cholera were fortunately absent during the year. "The sanitary condition of the city was in the same deplorable state as in previous years" writes Dr. Khanka; "so nothing more need be said about it"; he hopes, however, that the newly appointed Municipal Board will take steps to deal with it. An interesting feature of the report is that 60 mad dogs, captured inside the city during the year, were taken far away into the jungles and there liberated. The number of vaccinations carried out shewed a satisfactory increase, some 23 per mille of the population being vaccinated annually.

Twenty-nine hospitals and dispensaries were at work during the year and treated 2,31,824 out-patients and 5,403 in-patients. At the Mayo Hospital a large volume of surgical work was carried out during the year, eye work and operations for vesical calculus being especially prominent. Lithotaxy was carried out on 56 patients with only 1 death, and an analysis is given of the results. The duration of symptoms varied from 1 day to 3 years, the average time for the operation was some 20 minutes, and the largest stone dealt with weighed 1,230 grains. The average stay of these patients in hospital was only 4.69 days.

PASTEUR INSTITUTE OF SOUTHERN INDIA, COONOR. ANNUAL REPORT FOR THE YEAR 1923-24. BY LIEUTENANT-COLONEL J. W. CORNWALL, M.A., M.D., I.M.S. MADRAS: SUPERINTENDENT, GOVT. PRESS. 1924.

THE most striking feature in this report is the tremendous decrease in the number of patients treated at Coonoor, owing to the extended issue of the anti-rabic vaccine to government headquarter hospitals. Only 1,354 patients were treated at Coonoor, as compared with 3,375 for the previous year; whilst the numbers treated outside Coonoor rose for the same period from 1,248 to 3,692. The total number of patients treated with the Coonoor vaccine during the year, on adding up the above figures, shews the usual annual increase, 5,046 in 1923-24, as against 4,623 in 1922-23.

The vaccine is issued from Coonoor in sealed ampoules, and it is of some interest to compare the results of institutional treatment at Coonoor with those of treatment elsewhere. It had been anticipated that a considerable number of the patients treated at hospitals would fail to complete the course of treatment, but this has proved not to be the case; only 3.5 per cent. failed to attend daily for the complete course of treatment. On the other hand, it has proved exceedingly difficult to get in the desired reports and returns; information as to results could not be obtained with regard to no less than 40 per cent. of patients treated at hospitals. As a result the statistics for the Institute are not strictly comparable with those for patients treated elsewhere: at the former the total hydrophobia incidence was 0.29 per cent., among the 60 per cent. of those treated outside about

whom information is available, the total hydrophobia incidence was 0.84 per cent. Inasmuch as the total hydrophobia incidence at Coonoor for the years 1907 to 1924 works out at 0.97 per cent., however, the latter figure is not bad.

Turning to the comparative mortality amongst the treated and untreated respectively, Tables IV and V continue similar information given in previous years. In Table IV the death-rate from hydrophobia among 829 treated patients was 2.8 per cent.: as compared with a rate of 6.3, among 1,388 persons bitten by the same animals, but not treated. In Table V it is certain that the biting animal was both rabid and infective at the time of biting as shewn by the occurrence of at least one death from hydrophobia in each group of persons bitten. Here the mortality rate for the untreated works out a 35 per cent. "The figures shew very clearly" claims Colonel Cornwall, "that the risk of dying from hydrophobia, if bitten by a rabid animal which is really infective, is not less than 1 in 3.....as far as our information goes, this risk may be diminished by one-half by the anti-rabic treatment."

In Part III of the report, in view of the fact that in future the Institute is likely to become more and more of a vaccine distributing centre, and less and less of a treatment centre, an analysis is given of the Institute reports from 1907 to 1924. This provides a very useful summary of the facts. European patients contain so very large an element of those not in any way at risk that only 4 "failures of treatment" are recorded out of 2,648 such patients treated. Delay is clearly shewn to increase the risk, but 80 per cent. of patients arrive within 10 days of having been bitten. Rabies appears to be equally prevalent among dogs in Madras Presidency all the year round, but the number of persons bitten is slightly greater in the hot weather than in the cold,—possibly owing to the custom of sleeping out of doors in the hot weather. The percentages of deaths work out at 7.7 per cent. for persons bitten on the face, 1.0 per cent. for those bitten elsewhere on naked skin, and only 0.27 per cent. for those bitten through clothing. The second category of cases, however, constitutes 82.2 per cent. of the deaths which occurred. Of 30,253 patients treated between 1907 and 1924 more than a half, or 17,606 came from the Madras Presidency, and 3,460 from Mysore. Dog-bites totalled 95.7 per cent. as against only 2.7 per cent. of jackal-bitten cases. An interesting case recorded in the report of a male patient, aged 6, who developed hydrophobia no less than 411 days after being bitten by a rabid dog, and 398 days after completing treatment: the bites consisted of 4 tooth marks on the left buttock and small of the back.

Financially the net receipts for the year amounted to Rs. 73,689, and expenditure to Rs. 46,977.

GOVERNMENT GENERAL HOSPITAL, MADRAS.
ANNUAL REPORT FOR THE YEAR 1925.
SUPERINTENDENT, GOVERNMENT PRESS,
1924. PRICE RS. 6.

As is customary, this report is divided into two sections:—(a) administration report; and (b) professional reports by the staff,—the latter of which are full of interest. The accommodation available during the year was 528 beds, and the daily average sick treated 503. Out-patients during the year numbered 60,174 and in-patients 9,444. The chief causes of death among the latter were in order—diseases of the digestive system, 80 deaths; pneumonia, 64; injuries, 45; diseases of the circulatory system, 39; phthisis, 38; and other respiratory diseases, 22. The figures of percentage of deaths among patients admitted for different diseases are of interest, as reflecting conditions in a large general Indian hospital; some of the case mortalities recorded being—28 per cent. for pneumonia, 24 per cent. for diseases of the circulatory system, 20 per cent. for phthisis, 14 per cent. for enteric fever, 12.6 per cent. for kala-azar, 8.8 per cent. for dysentery, and 7.7 per cent. for liver abscess. (The figures are for Asiatic patients only).

Malaria shewed an increased prevalence in Madras during the year,—7,092 patients treated as against 5,850 in the previous year. The total number of operations performed was 2,461; whilst 283 medical students and 79 nursing probationers were taught.

The average daily cost of in-patients worked out at Rs. 0-9-3½ per Indian, and Rs. 0-15-10½ per European patient. Receipts and expenditure totalled Rs. 7,51,338, the chief items of the latter being miscellaneous charges, Rs. 1,59,431, and diets, Rs. 1,33,121.

Turning to the professional side of the report, Major G. E. Malcolmson, I.M.S., was in charge of the First Physician's wards. He notes that in 20 per cent. of the amoebic dysentery cases, malarial parasites were found in the blood, often without accompanying rise of temperature and usually of species *P. vivax*. In most of these cases, emetine stopped the blood and mucus, but an obstinate enteritis persisted, which in some instances yielded to quinine injections. The point is raised as to the association, if any, between the malaria and the dysentery. In some cases of quartan malaria parenchymatous nephritis was noticed. Interesting cases recorded are two cases of kala-azar with death from extensive hæmorrhage, and another case of kala-azar which died of perforation of an amoebic ulcer of the hepatic flexure of the colon, the only symptoms from which were a slight looseness of the bowels. At autopsy extensive ulceration of the colon was found. Ataxic paraplegia is noted as present in a case of benign tertian malaria; 10 cases of diabetes treated with insulin shewed rapid improvement; whilst brilliant green proved a failure in the treatment of kala-azar.

Major J. M. Skinner, I.M.S., was acting Second Physician. He records an interesting case of pneumococcal arthritis of both ankle joints with acute onset, in a boy of 16, two days after the crisis of lobar pneumonia. Salicylates had no effect at all in relieving the pain, but immediate recovery followed after injection of polyvalent anti-pneumococcal serum. Another interesting case was one of extensive pericardial effusion. The onset was gradual, with no history of rheumatism, and the patient remained at work until within two days of her admission to hospital. The cardiac dullness extended to the left mid-axillary line and two inches to the right of the sternum. Paracentesis removed 8 ozs. of blood-stained fluid.

Major W. L. Forsyth, I.M.S., Third Physician, notes on the large number of cases of asthma seen. Adrenalin injections gave relief in some 90 per cent. of cases, but belladonna, stramonium and the anti-spasmodic group of drugs proved useless. "The treatment of malaria remains the same,—intravenous quinine plus quinine by the mouth with free administration of alkalis to bring the urine to an alkaline pH." In valvular heart lesions with much oedema and ascites, large doses of the infusion of digitalis give better results than does the tincture. Many of the female patients admitted shew extreme anæmia associated with acute pyorrhœa and the presence of a hæmolytic streptococcus in the gums. The need for education in schools, on dental matters, is not half realised in India.

Dr. M. R. Guruswami, Fourth Physician, records a case of a patient aged 38, admitted with acute dilatation of the heart and orthopnoea. Venesection and other measures relieved the condition, which, however recurred. The periodicity of the attacks aroused suspicion, the blood was examined and malignant tertian parasites found. The patient improved considerably on quinine treatment. A second interesting case was one of mixed tenia infections, the patient suffering from intense neuro-retinitis and dying in convulsions. Post-mortem examination shewed one *Tenia saginata* in the gut, and numerous cysts of *Cysticercus cellulosæ* throughout the cerebrum, and especially in the grey matter. Ten cases of broncho-pneumonia were associated with intense ascariis infections,—one of them passing 350 worms, under treatment; the lung condition

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improved in all, on anthelmintic treatment. Another interesting case was one shewing signs of complete consolidation of the left lung, but with a positive Wassermann reaction; the condition simulated phthisis, but there were no signs of cavitation, and the case cleared up completely on anti-syphilitic treatment.

The very interesting report of the First Surgeon, Lieutenant-Colonel E. W. C. Bradfield, I.M.S., has already been published in our columns: (*Indian Medical Gazette*, October 1924, p. 515). Lieutenant-Colonel R. B. B. Foster, I.M.S., Second Surgeon records 672 operations during the year, with a mortality of 8.9 per cent.: this, however, includes 16 cases admitted in a moribund state. Interesting cases were (1) A case of fracture of the atlas, with complete paralysis and some wasting of the muscles of the extremities, but without sensory disturbance. Complete recovery of function ensued, but with slight angular deformity and rigidity of the neck. (2) Two cases of cystic goitre about the size of a coconut each; complete removal of the gland was not followed by any evidence of thyroid disturbance. (3) A patient from whom a thyroid carcinoma had been removed five years previously: re-admitted with metastases in the cervical and axillary glands and vertebrae, with spastic paraplegia. (4) A case of lympho-sarcoma of the duodeno-jejunal flexure, cured of symptoms by posterior gastro-enterostomy.

Major K. G. Pandalai, Third Surgeon, records the successful use of spinal anaesthesia in patients who were in a poor state, with no trained anaesthetist available: amongst other operations conducted under spinal anaesthesia were gastro-enterostomy, partial gastrectomy, excision of a tubercular caecum, and hernias. In 80 per cent. of the cases of gastric or duodenal ulcer, there was no difficulty in diagnosis, but in the others where this disease was suspected such diverse conditions as chronic appendicitis, visceroposis, hepatic cirrhosis and tubercular peritonitis were found. In 9 cases with symptoms typical of ulcer, no abdominal lesion could be found: the abdomen was closed, but the patients returned later with the same symptoms, and posterior gastro-enterostomy cured the symptoms; hyperchlorhydria was the probable cause of them. The degree of mobility of the ascending colon varies very widely, claims Major Pandalai, and he has given up fixation operations. Sixteen cases of liver abscess were treated by aspiration plus emetine with complete success, and 3 cases of elephantiasis of the leg by the Kondoleon operation with good results. In the treatment of ventral hernias, the abdominal musculature is often found to be weak and atrophied; the use of filigree implantation is here useful. In a case of aneurism of the innominate artery and arch of the aorta, the third part of the axillary artery and the common carotid immediately below the omohyoid were ligated at the same sitting; the result was completely successful. A growth of a jet black colour, $1\frac{1}{2}$ in. \times $\frac{3}{4}$ in. at the outer canthus of the left eye, involving both lids, was found to be a melano-endothelioma. Four cases of suppuration in the antrum of Highmore were admitted,—all due to retained stumps after tooth extraction. One of these developed abscess of the lung after operation, but ultimately recovered. In an infant one year old, a large swelling was found filling the entire pelvis. On operation the swelling proved to be a congeries of thick-walled, cystic spaces containing mucoid fluid, the upper end of the swelling extending to the level of the kidneys, its position being retro-peritoneal and in the mid line in front of the vertebral column. The sacrum and coccyx were practically absent. The cysts were reported on by the pathologist to be of ependymal origin.

In the out-patient department, Major Paton complains of the very urgent need for improving the emergency operation theatre, and also pleads for the commencement of a skin out-patient clinic. During the year 797 patients attended for anti-rabic treatment, but only 399 of them completed the 14 days' course of

injections. The growth of the work in the x-ray Institute under Captain T. W. Barnard is shewn by 17,778 exposures or treatments in 1923 as against 11,757 in 1922 and 2,531 in 1919. The results in x-ray treatment of cancer are encouraging and special apparatus is being imported for this. An exhibit was accepted by the Royal Photographic Society of Great Britain for their 68th annual exhibition in London. In the Dental Department 4,566 patients were treated during the year.

As will be seen, the report covers a wide area of professional interest.

ANNUAL REPORT ON THE CIVIL HOSPITALS AND DISPENSARIES IN THE MADRAS PRESIDENCY FOR THE YEAR 1923. MADRAS: SUPERINTENDENT, GOVERNMENT PRESS, 1924. PRICE, RS. 2-6-0.

At the close of the year 1922 there were 758 medical institutions of all classes in the Presidency. Eighteen new dispensaries were opened and eight closed, leaving 768 in working order on the last day of the year 1923. Of the newly opened dispensaries three were State-public, twelve Local Fund, and three private non-aided institutions. Seven dispensaries out of the eight closed during the year were Local Fund institutions and one was a private non-aided dispensary.

Medical progress in many parts of the presidency was much hampered by the straitened circumstances of Provincial finances. It is hoped that a large number of new medical institutions will be established when funds become available. The question of opening more hospitals and dispensaries in each district in places at which their need is most felt, thus securing adequate medical aid to the people of the presidency, is at present engaging the attention of the Government.

The patients treated in in-door departments of the hospitals and dispensaries of this presidency numbered 133,910 in 1923 against 131,510 for the previous year.

To the improved and special arrangements calculated to secure greater attention and comfort to all patients must be attributed the rise in the number of in-patients in almost all medical institutions. Of the in-patients treated, 83,178 were cured, 23,870 relieved and 15,686 discharged otherwise against 80,751, 24,360 and 15,841, respectively, in 1922.

There were 6,012 deaths during the year and the death-rate was 4.49 as compared with 4.67 in 1922. The death-rate, it is noted, is greater in the city State institutions than in the mofussil ones, as the former admit many more accident and serious cases than the latter.

Consequent on the increase of in-patients, the daily average attendance, which was 5,812.31 in 1922 rose to 6,048.30 in 1923.

The number of beds available (excluding 171 beds common to both Europeans and non-Europeans in the Government General Hospital, Madras) was 7,907 (4,479 for men and 3,428 for women) as against 7,859 (4,478 for men and 3,381 for women) in 1922. The increase in the number of beds for women speaks well of the popularity of the institutions and of the lady doctors in charge.

Altogether 8,220,258 and 8,098,588 patients sought out-door relief at the hospitals and dispensaries in 1923 and 1922, respectively. The excess over the previous year's figures is 121,670. The out-door work of the institutions is progressing yearly. The combined total of in and out-door patients was 8,354,168 in 1923 as compared with 8,230,098 in 1922.

The steady rise in the number of patients treated was mainly due to the increasing appreciation of western methods of treatment and the popularity of the medical officers and subordinates.

As usual malaria contributed a very large number of patients. Diseases of the skin and ear were responsible for 979,714 and 559,215, respectively, of the patients treated. Affections of the eye are among the most common ailments and the attendance on this account has shown a rapid increase.

366,661 operations were performed on 356,721 patients as compared with 337,127 operations on 327,660 patients in 1922, showing an increase of 29,534 operations. The statements received from District Medical Officers and Superintendents of other institutions show a marked increase in the number of operations performed at the various hospitals in the presidency. Instruments and appliances to meet the requirements were supplied to all hospitals and dispensaries. 26,501 operations were returned as really "major" against 24,350 in 1922. The death-rate among the patients operated on was only 2.4 per cent. The excess in the number of operations over that of the previous year and the low death-rate shows the increased confidence of the public in the surgeons and the greater care devoted by them to the patients operated on.

The year opened with a cash balance of Rs. 17,215 against Rs. 13,040 in the previous year. Government contributions during the year amounted to Rs. 29,11,709. Local Boards and the municipalities contributed Rs. 25,98,639, or nearly 44.1 per cent. of the receipts. The contributions from Government show an increase proportionate to the growth in expenditure. The total expenditure during the year amounted to Rs. 58,91,569.

Hookworm Disease.—During the year 20,790 persons were examined for hookworm infection. Of these, 16,563 persons or 79.70 per cent. were found to harbour the parasites in greater or smaller numbers. Ninety-four per cent. of persons examined for all intestinal parasites harboured some kind of intestinal parasite or other. The total number of treatments administered during the year in various localities was 93,469. The educational side of the campaign is notable inasmuch as 3,034 lectures with lantern slides were delivered in various vernaculars to audiences aggregating 274,000. The source of infection of hookworm and its remedy were well impressed on the audiences by the lectures and by free distribution of pamphlets and leaflets and the publication of a series of articles on the subject in the local newspapers. The Director is to be congratulated on the success of the campaign during the year.

Small-pox.—During 1923 the total treated was 1,702 with 192 deaths against 2,395 with 393 deaths in 1922.

The total cadre of appointments for Indian Medical Service officers in the Madras Civil Medical Department (including jail and bacteriological appointments and the leave reserve) was fixed at 50. The leave reserve for Indian Medical Service officers was increased from 20 to 27½ per cent. Eleven appointments hitherto reserved for Indian Medical Service officers were thrown open to members of the Madras Medical Service. In accordance with the recommendations of the Public Health Retrenchment Committee the leave reserve for civil assistant surgeons and sub-assistant surgeons was reduced from 15 and 25 per cent., respectively, to 10 per cent. in both cases and the plague reserve for sub-assistant surgeons was abolished. As the pay of the officers of the Madras Medical Service was raised from 1st April 1920, the minimum as well as the maximum having been increased a hundred per cent., Government abolished the charge allowance of Rs. 30 per mensem drawn by civil assistant surgeons holding sanctioned appointments on the ground that there was no justification for the retention of such an allowance. The pay of the sub-assistant surgeons having been revised several times since 1894, the initial as well as the maximum pay having been doubled since 1916, the Government considered that there was little justification for the retention of the free quarters or house-rent allowance in lieu thereof in their case. Accordingly, orders were passed withdrawing the concession from sub-assistant surgeons.

ANNUAL REPORT OF THE DIRECTOR OF PUBLIC HEALTH, MADRAS, FOR THE YEAR 1923. BY DR. K. T. MATTHEW, L.R.C.P., L.R.C.S. (EDIN.), D. HY. (DUR.), D.P.H. (CANTAB.), MADRAS: SUPERINTENDENT, GOVERNMENT PRESS, 1924. PRICE 14 ANNAS.

THE year under review saw the formal establishment of a complete self-contained public health staff working under the district boards throughout the Presidency. The lines on which the campaign against disease and death was to be conducted had been laid down in advance and the campaign was started in April 1923 by a small but well-trained and well-disciplined corps of health officers under the generalship of the Director of Public Health and his staff of assistants. The period of nine months during which the campaign was carried on in the year under review is too brief to admit of any decisive victory in the almost never-ending war between man and the microbe; nevertheless in more than one field notable success has attended the efforts of the public health staff, helped by hearty co-operation on the part of local authorities and the public generally. The success achieved was particularly marked in the campaign against cholera and relapsing fever, and specially good work was done in the districts of Coimbatore, Tanjore, Trichinopoly, Kistna and Madura. A few salient details relating to the more important disease are given below.

Cholera.—Deaths from cholera showed a considerable decrease, the number registered during the year being 5,169 (0.1 per mille) against 16,502 (0.4 per mille) in 1922 and the quinquennial average rate of 1.4 per mille. This figure is the lowest on record though no district was entirely free, and the delay of the village officers in reporting outbreaks of the epidemic, of which there were very many instances, seriously handicapped the efforts of the health staff. Excellent preventive work in the shape of epidemiological investigation was done in the districts of Cuddapah, Coimbatore, North Arcot and Ganjam. The marked decline in cholera mortality in the Ganjam district may reasonably be attributed to such preventive work, coupled with special precautionary measures for guarding probable sources of infection. Excellent work was also done in South Kanara where, as the result of special care taken by the Health Officer and his staff, the villages seriously affected by floods escaped from epidemics of every kind.

Small-pox.—The number of deaths from small-pox rose from 22,801 to 24,434, the death-rate being very high in South Arcot and Malabar. The fact that about 35 per cent. of the total mortality from small-pox occurred among children under one year and another 35 per cent. occurred among children under 10 years clearly demonstrates the urgent need for more vigorous action on the part of local bodies and their health staff in respect of primary vaccination. It is melancholy to reflect that a disease like small-pox which has been almost entirely eliminated in most civilised countries for very many years by the adoption of simple, seasonable and sure preventive measures should in this country continue even in the 20th century to kill over 24,000 human beings and leave marks of its ravages on many more. It would indeed appear that ignorance and prejudice are most serious obstacles to the advancement of public health, especially when they are not confined entirely to the illiterate masses who know no better but are to be found even among the higher strata of the community. Educational propaganda to produce its real effect cannot therefore be limited in scope to the former class but must be made to reach the latter also.

Plague.—The number of deaths from plague rose from 9,193 in 1922 to 12,110 in 1923. Sixteen districts were affected, but 96 per cent. of the total mortality from the disease occurred in four districts, viz., Madura, Coimbatore, Salem and Bellary. It is observed that the largest number of inoculations was also

made in these districts. Inoculation does not, however, cut at the root cause of the outbreak of plague. Plague is a disease of rats and unless on the one hand the importance of rat destruction and of the construction of rat-proof godowns and houses on the other is fully recognized and permanent preventive measures are adopted no radical improvement can be reasonably expected in the existing state of things.

Relapsing fever.—Relapsing fever was prevalent in ten districts. Though there were about 400 deaths in the first quarter of the year in the Tanjore district from relapsing fever, the epidemic was, by the end of March, effectually eradicated from the district as a result of prompt and vigorous action on the part of the health staff. In the Trichinopoly district, where the epidemic continued till the middle of 1923, effective preventive measures were taken by the district health staff in the shape of propaganda and an intensive de-lousing campaign. The timely action of the district health staff probably saved the Bellary district from the danger of an epidemic of relapsing fever. The success which attended the campaign against relapsing fever everywhere is a striking example of the inestimable advantage derived from a well-trained and properly equipped public health staff, an advantage which some local bodies even in urban areas do not appear always to realize.

Hookworm disease.—The anti-hookworm campaign was conducted on a large scale during the year. The North Arcot district was selected for an intensive educational campaign, the object being to carry the treatment to the very doors of the people and to familiarize them with the commoner aspects of the disease and the methods of bringing it under control. Nearly 3,000 lectures were delivered to audiences aggregating 265,000 persons during the year; 93,469 treatments were administered. Of 20,790 persons examined at random the percentage of infection with hookworm was 79.7.

Registration of vital statistics.—In spite of the efforts of the newly appointed district health staff, registration continued to be defective. A noteworthy feature was that registration was more unsatisfactory in several areas where it is compulsory, than in areas to which compulsion has not been extended, a reminder to public authorities that compulsion is neither the only remedy nor a sure remedy. The importance of accurate vital statistics must be brought home not only to the registering officers but to the people also, before any real improvement can take place in registration work. Errors in compilation are likely to be reduced when the work of compilation is transferred to the District Health Officers. The fact that as many as 62,214 unregistered births were detected by the district health staff and that there were several instances of deaths from cholera registered as deaths from fevers illustrates the defective and inaccurate character of the work performed by registering officers. There was, however, appreciable improvement in the registration work in rural towns.

Birth-rate.—The birth-rate exceeded the death-rate in every district. Only the Chittoor and Nellore districts showed a decrease of 8.8 and 1.2 per mille, respectively, on the previous year's rates. The recorded birth-rate for the Presidency was 33.1 against the estimated average rate of 42.5. The birth-rate for the year is greater than the decennial average for the ten years ending 1922 by 2.9 per mille.

Death-rate.—With the exception of Cuntur, Kistna and South Arcot, all the districts showed a decreased death-rate when compared with the decennial average. All districts except six showed, however, an increase in the death-rate as compared with 1922, the increase being most marked in Guntur, South Arcot. The Nilgiris, Anantapur, Kistna and Coimbatore. Infantile death-rate during the year was 173.7 per mille of registered births against 166.4 in 1922 and 182.3 the quinquennial average. The death-rates in municipalities, however, shewed a decline. The general impression created

by the mortality figures is a saddening one, especially the figures of infant mortality. The death-rate is a reliable index of the general state of public health; as the general health mounts higher the death-rate sinks lower and vice versa. This is so because conditions affecting health, though they may not prevent or cause death in the individual, may nevertheless produce a marked variation in the general death-rate. In a total mortality of 908,825 during the year there were no less than 235,969 deaths of infants under 1 year, and 134,615 deaths of children between 1 year and 4 years. No one who ponders seriously over these tragic facts can avoid coming to the conclusion that the welfare of children who cannot look after themselves has failed to receive the care and attention rightly due to it from either their parents and guardians or the local authorities who are primarily responsible for public health administration.

Maternity and child welfare.—The total number of deaths registered under maternal causes in districts including municipalities was 2,892. This figure does not, however, represent the actual mortality which cannot be much below 25,000. The high rate of maternal and infantile mortality must be attributed mainly to the ignorance of the people and partly to the lack of efficient medical relief in rural tracts. A gradual elimination of the latter cause may be expected when the scheme which the Government have under consideration for the extension of medical relief in rural areas is brought into effect. The cordial response made by the people in rural areas to the health and baby welfare movement on the one hand and the gratifying success achieved in this field in the presidency town on the other, indicate that ceaseless propaganda in the villages and the organization of child welfare centres in charge of lady health visitors in urban areas are the two main lines on which public and private efforts to improve maternal and child welfare should proceed in future.

Propaganda.—The great value of propaganda work as a preventive measure was illustrated at a lecture on plague delivered during the National Health and Baby Week at Ranipettai. One of the audience, on hearing that plague infection was carried through rats, at once gave information that there were rat falls in the town, and this led to the discovery of the disease and the taking of prompt measures in time with excellent results.

Owing to the praiseworthy labours of the Madras Health Council and the efforts of the district health staff, health propaganda received considerable attention during the year. Lectures were delivered to large audiences, and posters and pamphlets distributed at the close of the lectures, and demonstration made with the aid of magic lanterns. Until the health staff are sufficiently equipped with magic lanterns and accessories, propaganda work will continue to suffer a serious handicap.

Fairs and festivals.—The arrangements made were, on the whole, adequate and satisfactory. It is also gratifying to note that there was no outbreak of any epidemic at any of the festival centres, the arrangements for which were supervised by the district health staff.

No new scheme of water-supply or drainage was brought into operation during the year. On the recommendation of the Retrenchment Committee, the Government abolished three posts of Assistant Director of Public Health and re-distributed the duties of the remaining three on a functional basis with headquarters at Madras. This measure of economy has not involved any loss of efficiency but has, on the other hand, brought about better co-ordination of the work of the District Health Officers in the various branches of public health administration. A great deal has been attempted, a good deal done, and a great more remains to be done. Public health is not a field in which an early harvest can ordinarily be expected. The acting Director, Dr. Matthew, is to be congratulated on his

successful administration of the department during the absence of the permanent Director on leave.

ANNUAL REPORT OF THE HOSPITALS AND DISPENSARIES, BIHAR AND ORISSA, FOR THE YEAR 1923. BY COLONEL H. AINSWORTH, M.B., F.R.C.S., I.M.S. PATNA: SUPERINTENDENT, GOVERNMENT PRINTING, BIHAR AND ORISSA, 1924. PRICE RS. 4.

THERE were 485 hospitals and dispensaries open on the 1st January and 546 on the 31st December 1923, an increase of 61 against 31 in 1922. Seventy-seven new dispensaries were opened during the year, 62 by district boards, 13 by railway companies and 2 by private bodies. Sixteen dispensaries were closed during the year. Of these, 7 were maintained by local bodies and 5 by private bodies; 3 were railway hospitals and 1 a Public Works Department (Irrigation) dispensary.

The total number of patients treated at the State-public, Local Fund and private-aided dispensaries was 3,586,552 against 3,136,281 in 1922 or an increase of 450,271 which is shared by all classes of dispensaries except travelling dispensaries. The fall in attendance at the travelling dispensaries in 1923 was due to the closure of some of them. When new dispensaries were opened in certain districts, the travelling dispensaries were abolished.

The year was a healthy one. The death-rate was 25.0 per mille compared with 24.1 in the preceding year. This slight increase was probably due to malaria and plague which were prevalent in certain districts.

The total number of deaths from cholera decreased from 26,805 to 8,198. 3,967 cases were treated in hospital compared with 4,698 in the previous year. These figures appear to shew that there is an increasing tendency on the part of the people to bring these patients to hospitals for treatment.

Plague was much more prevalent in 1923 than it was in the previous year; the death-rate per mille rose from 0.4 to 0.8. Certain districts of the Patna and Tirhut divisions were chiefly affected.

Small-pox was prevalent in certain districts during the year and the deaths increased from 2,560 in 1922 to 3,161; 407 patients were treated in hospitals.

Deaths from malarial fevers rose from 578,656 in 1922 to 599,840 in 1923 and the death-rate from 17.0 to 17.5 per mille. The total number of patients treated for malaria in hospitals and dispensaries was 932,508 compared with 865,716 in 1922.

Influenza: 26,439 patients were treated for influenza in hospitals and dispensaries in 1923 against 30,191 in 1922. Vaccine was provided by Government to all civil surgeons and superintendents of jails, free of cost, and was available whenever required.

The total number of patients treated for venereal diseases was 64,172 against 62,567 in 1922. A special grant of Rs. 12,000 was given for the purchase of special drugs used in the treatment of syphilis. This grant was distributed to all Sadar and police hospitals and to many subdivisional dispensaries.

Rai Bahadur Dr. P. N. Das continued his investigation in connection with filariasis and read a paper at the Indian Science Congress on the results of his previous year's work. Ninety-two cases were treated by him in 1923, against 90 in 1922, with good results. A special hospital for the treatment of these cases has been built and equipped at Puri.

The number of cases treated for kala-azar increased from 17,212 in 1922, to 20,619. This increase is probably due to patients coming to hospitals more freely for treatment and not to an increase in the prevalence of the disease. The treatment by intravenous injection of various drugs appears to be increasing in popularity in many of the districts where the disease is prevalent.

The cases treated in hospitals and dispensaries for tubercle of the lung numbered 8,924 against 6,825 in

1922, and deaths among them were 131 and 116 respectively. There are no special hospitals for the treatment of these cases.

Ankylostomiasis is prevalent all over the province—the northern districts appear to be more heavily infected than others. During the year a special investigation was commenced by Dr. Korke in the Singhbhum district under the auspices of the Indian Research Fund Association.

In the ten leper asylums at work during the year there were altogether 2,082 resident lepers against 2,010 in 1922.

The number of surgical operations performed during the year under report at the State-public, Local Fund and private-aided hospitals and dispensaries was 206,814 with 346 deaths against 175,164 operations and 252 deaths in 1922.

The total income of the hospitals and dispensaries during 1923, excluding the opening cash balance, was Rs. 22,87,411 against Rs. 17,54,636 in 1922 and the total expenditure, excluding amounts invested during the year, was Rs. 20,69,495 against Rs. 16,98,966 in 1922.

The buildings of the Ranchi Radium Institute were completed and equipped. The successful treatment given in past years has drawn a large number of patients, and the rise in figures shows that the work of the institute is greatly appreciated. There were 189 new cases treated in the year under report against 86 in 1922.

The maternity and child welfare scheme continued to work satisfactorily at Patna under the supervision of Mrs. Duncan White, Maternity Supervisor. A similar scheme has been organised at Cuttack under the auspices of the Red Cross Society.

Reports on the working of the two mental hospitals in the province have been published separately. The construction of the buildings for the mental hospital for Indians at Kanke has made satisfactory progress. Most of the buildings have been completed. The hospital will probably be ready to receive patients in August 1925.

The necessity for a Medical College for the province has been very keenly felt. To supply this long-felt want it was decided to transfer the Temple Medical School from Patna to Darbhanga and establish a new Medical College at Patna. The plans and estimates of the additional buildings required for the college and the attached hospital with their equipment have been prepared.

Eight new posts were added to the cadre of assistant surgeons and the cadre of sub-assistant surgeons was reduced by 9 posts. One assistant surgeon and six sub-assistant surgeons retired during the year. One assistant surgeon resigned the service. The pay of sub-assistant surgeons was revised and an increased rate of teaching allowance was sanctioned for the teachers of medical schools.

REPORT ON THE JAIL ADMINISTRATION OF THE PROVINCE OF ASSAM, FOR THE YEAR 1924. BY COLONEL C. H. BENSLEY, C.I.E., K.H.P., I.M.S., INSPECTOR-GENERAL OF PRISONS, ASSAM. SHILLONG: ASSAM SECRETARIAT PRINTING OFFICE, 1925. PRICE RE. 1.

THERE was a very distinct all-round decrease in the number of prisoners in the jails during the year, as compared with the previous year. One of the most satisfactory features was the reduction in the number of prisoners under the age of 21. There was only one juvenile prisoner. There is very much to be done for the young prisoner in this country. The position of the magistrate is a difficult one on account of the absence of some society to take over charge of these young offenders.

It is unfortunate that it was necessary to send to jail in 1924, 87 lads between the ages of 16 and 18 years and 182 between the ages of 19 and 21 years, mainly for the want of Aid Societies. These lads are at the most impressionable ages of their lives, and where, through constructional defects, separation from adults

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cannot be carried out thoroughly, the danger of their becoming contaminated during their stay in jail is a very real one. It is useless suggesting Borstal jails or suggesting improvements in existing jails to bring them up to date and to provide facilities for separation of the classes, when those who fulminate against the jail administration in this province at the same time begrudge the expenditure of money on the most necessary requirements to permit of the introduction of the most elementary rudiments of jail administration.

It is for public enterprise to start these Discharged Prisoners' Aid Societies, if they are to meet with any success. Probably, Government would give a small grant to any which were proving their utility in aiding to keep first offenders, both adolescent and adult, out of jail, and in giving a helping hand to released prisoners in the first few months of their freedom and so prevent them returning to jail. It is public spirit and enterprise which is required, and it is the presence or absence of this which will be the proof whether the sentiments expressed by a section of the public are sincere or not.

Discharged Prisoners' Aid Societies will not be successful if run by Government through its own servants; such influence would be misunderstood by prisoners once they are released.

Death.—The rate for the year is 19.51 per mille. This is the lowest figure for a number of years. It is however still well above the average death-rate for jails all over India. The total number of deaths was 46; the largest number from any one disease being 9 from pulmonary tuberculosis. Pneumonia was the cause of 7 deaths and dysentery 6. No deaths from kala-azar were reported.

Sickness.—The sickness rate 29.48 per mille is the lowest that has been recorded during the last 10 years. The largest number of admissions was for malaria and the next largest for diarrhoea. There were 28 cases of pneumonia with a 25 per cent. death-rate and 16 of pulmonary tuberculosis with a death rate of over 56 per cent.

55 per cent. of prisoners gained in weight during their stay in jail and only 20 per cent. lost in weight; the balance retained their original weight.

The medical statement can be looked upon as very satisfactory. The one somewhat alarming feature is the number of cases of pulmonary tuberculosis and the high death-rate amongst them. An interesting point is the fact that kala-azar is not given a separate heading in the table showing the cases of sickness and death from the chief disease nor is the disease anywhere mentioned as a cause of sickness or death amongst the jail population.

THE FIFTH ANNUAL REPORT OF THE CENTRAL CO-OPERATIVE ANTI-MALARIA SOCIETY, LTD., CALCUTTA.

THIS Society, as probably most of our readers are aware, was started in 1917 by a number of enthusiastic medical men to show the people in the rural districts of Bengal how to protect themselves against the dragon that has for many years been preying on the villagers of Bengal—*Malaria*. Amongst the prime movers were such men as Sir Kailas Chandra Bose, Dr. C. A. Bentley and Rai Bahadur G. C. Chatterjee. With such men at its head the movement was certain to obtain a sufficiency of followers as long as the necessity for their activities existed. Unfortunately this necessity does exist and we fear may continue to exist for many years. The report for 1924 shows this and also shows the wonderful way in which this necessity has been met. The history of the Society tells of a series of giant strides,—in 1918 the work was being carried out in eight villages, in 1923 in 82 villages and in 1924 in 360 villages. The Society first started as a purely voluntary Society, most of the workers were entirely unpaid and the medicine and appliances were supplied

by funds collected privately. The Bengal Government now gives this Society a substantial subsidy but it would be impossible for it to carry out the work which it is doing if much of the work that is done was not entirely unpaid.

The last year's report has demonstrated one point, the versatility of the Society. These modern St. Georges went forth to slay one dragon but they found that another dragon existed—apparently a somewhat more rapacious dragon—*kala-azar*. With great good sense they divided their forces and turned their attention to the treatment of this disease also; the returns for 1924 show that nearly 20,000 of cases of kala-azar were treated during the year. This fact surely must be a revelation to the health authorities who only a couple of years ago estimated the kala-azar cases for the whole province at 50,000.

The working of the Society reflects great credit in its founders and also on its energetic Secretary, Rai Bahadur Dr. G. C. Chatterjee.

CALCUTTA DENTAL COLLEGE AND HOSPITAL. ANNUAL REPORT FOR 1924-25. BY R. AHMED, D.D.S.

THIS institution was founded in 1920 and has already students from all over India on its books, the present number being 22, with accommodation for not more than 50 altogether. A syllabus has been drawn up with special regard to Indian requirements. The institution is entirely self-supporting and has not received any grants from government or other sources. The annual fee of Rs. 500 may seem high, but not when the cost of equipment and accessories is considered. During the year 1920 attendances were made by patients and an enquiry was made into the dental condition of students in the Calcutta schools and colleges. Quite 75 per cent. of them were found to have dental defects, and one of the chief aims of the institution is to arouse attention to this very important problem.

Correspondence.

A HINT ON THE TRANSMISSION OF KALA-AZAR.

To the Editor, "THE INDIAN MEDICAL GAZETTE."

SIR,—I would like to bring the following facts to the notice of those who are engaged in the kala-azar transmission problem.

I find in my inspection of kala-azar infected villages of Tipperah District that the disease is specially prevalent amongst the poor people who are living in insanitary conditions regarding their personal hygiene, and in small, dirty and overcrowded huts, thus in close contact with patients.

The condition that is responsible for the spread of typhus and relapsing fever is generally present in this case too. I intend to give prominence to the interesting fact that in every infected area *dhobies* and barbers are particularly attacked. In some villages they have started the disease and in an infected locality it is rare to find a *dhobie* or a barber remaining unaffected.

I think a close search for the parasite in lice from the patients may help us to find the agent, because *dhobies* and barbers are persons who are most liable to be infected through this agent. Although the disease is known to attack persons of cleaner habits yet the louse may be one of the agents to spread the disease.

The difficulty in checking the spread of kala-azar cannot be solved unless the cause of transmission is ascertained. At present we are solely dependent on the successful treatment of a kala-azar patient by disinfecting the blood with antimony; but this is an expensive affair, neither is it perfect, because all patients will not

come for treatment at the same time. When there are, say, three cases in a family, one may attend while the rest watch the result of his treatment before they dare to come themselves for treatment. The infection is thus spread to many others while they mark time. Under the above circumstance compulsory attendance at centres by the introduction of an Infectious Diseases Act is necessary to prevent its spread till we find the means of transmission.

I have noticed that the death rate from fevers, and consequently the total death rate, can be lowered by treating kala-azar cases alone. If we can prevent the spread of this disease it is certain the death rate will decrease at once and there will also be an increase in birth rate of this province.—Yours, etc.,

A. K. MUKERJI,
District Health Officer, Tipperah.

COMILLA,
30th April 1925.

COMPRESSION OF THE EYEBALL BEFORE CATARACT OPERATION WHEN ESCAPE OF VITREOUS OR CHOROIDAL HÆMORRHAGE IS APPREHENDED.

To the Editor, "THE INDIAN MEDICAL GAZETTE."

SIR,—May I request you to publish the following note?

A drop of 4 per cent. cocaine lotion with which a little adrenalin is mixed is instilled into the eye before operation. The patient lies on his back with his chin raised and closing his eye presses it backwards fairly firmly with the tips of his fingers. He is not likely to cause excessive pressure. Another drop is instilled about 8 minutes afterwards and pressure continued. In 15 or 20 minutes he is ready for operation. I have now stopped pressing the eyeball myself; the patient does it.

I wrote a short note on the subject, which was published in the *Indian Medical Gazette* for June 1923, but cataract surgeons do not appear to have noticed it. This simple and harmless measure reduces the tension considerably.

Captain Cruickshank, I.M.S., has mentioned this step in his article on "Choroidal Hæmorrhage following Cataract Extraction" in the *Indian Medical Gazette* for May 1925, hence this note.—Yours, etc.,

HARI SHANKER, R.B., I.M.S.

MUTHRA, U. P.,
11th May 1925.

RELAPSING FEVER AND DYSENTERY.

To the Editor, "THE INDIAN MEDICAL GAZETTE."

SIR,—Towards the latter part of an epidemic of widespread relapsing fever on the Nilgiris I had occasion to meet with a number of cases of dysentery occurring in relapsing fever patients. Such cases were not met with in the early days of the epidemic. A day or two previous to the fall of temperature of the first pyrexial period, more often at the beginning of the apyrexial period, dysentery starts. The patient has very frequent stools of blood and mucus; there is more blood than mucus. Motions average about 30 to 40 in 24 hours. If the complication starts in the pyrexial period the usual novarsenobillon or sulfarsenol injection cures the dysentery also, but difficulty arises when the dysentery starts in the apyrexial period. In the apyrexial period when spirilla are not present in the peripheral blood the injection does more harm than good. In the increased toxæmia of the apyrexial period the shock of reaction after the injection very often kills the patient. Even if the patient survives, injection at this stage does not alter the course of the fever nor of the dysentery. I have repeatedly examined these stools for amœbæ but have not been able to find them. Very often in a stained specimen of the stool the spirillum of relapsing fever has been found. This was probably because there was blood in the stool.

I did not make an examination for *B. shiga* because I did not suspect that bacillary dysentery would have a partiality to relapsing fever patients.

I have not had occasion to do a post-mortem on a case that ended with dysentery and therefore do not know of the pathological changes in the intestine.

What I used to do by way of treatment—with success—in apyrexial cases was to give frequent astringent bowel washes,—Pot. permanganate pills, Pulv. Doveri—in suitable cases. Vigorous symptomatic treatment is essential to save the patient from collapse and death during this period. Castor oil emulsion and emetine have been tried, but without much success. When the temperature again rises an injection of sulfarsenol saves the patient.

I would like to hear from those more experienced in relapsing fever whether they have noticed this frequent complication and whether the spirilla do cause a specific ulceration of the bowel. Further investigation would be an advantage.—Yours, etc.,

T. K. KOMAN NAIR, L.M.P.,
Medical Officer, Kotagiri.

(Formerly in charge of Relapsing Fever Operations, The Nilgiris.)

THYROID EXTRACT IN THE TREATMENT OF NEPHRITIS.

To the Editor, "THE INDIAN MEDICAL GAZETTE."

SIR,—With reference to Dr. Eapen's invitation to your readers to express their opinion on thyroid extract in nephritis, I would like to say it has been completely disappointing in mine.

Last year a British officer was under treatment for subacute parenchymatous nephritis with severe anasarca. Diuretin, digitalis (there was some cardiac involvement also), and thyroid extract all had their turn, with no relief. It was eventually decided to give tincture of Apocynum, the famous vegetable trocar, a trial and within a week the patient was a different person. I don't pretend to aver that there was a cure; the case was too far gone, but from intense anasarca and ascites to a tolerably comfortable state is a great advance.—Yours, etc.,

B. J. BOUCHE,
Assistant Surgeon, I.M.D.

JUTOGH, SIMLA HILLS,
15th April 1925.

INTRAVENOUS PITUITRIN.

To the Editor, "THE INDIAN MEDICAL GAZETTE."

SIR,—In your issue for March 1925, Dr. S. Serhachar writes that as a result of a hypodermic injection of 1 c.c. of pituitrin in a puerperal patient, the patient had some unpleasant symptoms, such as intense and sudden pain of a stabbing character in the right side of the chest and back, orthopnoea, paleness of face and slowing of pulse. He attributes these symptoms to "air embolism of the right pulmonary artery" as a result of "dislodged clots occluding the orifices of some of the vessels in the uterine wall" consequent on the sudden rise of blood pressure.

Again in your issue for June 1925, Dr. D. M. Vasavada states he had also experienced similar symptoms in two of his cases and that these symptoms occurred after an intravenous injection of pituitrin. From the occurrence of these symptoms he concludes that "pituitrin is not for intravenous use and the further it is kept from a vein the better."

When one understands the pharmacology of pituitrin it is not difficult to find the cause of the above symptoms. Personally I do not think they were due to air embolism as suggested by Dr. Serhachar. Pituitrin when given either hypodermically or intravenously contracts the coronary arteries of the heart and has a depressant action on the cardiac muscle. Thus when pituitrin is administered it manifests its action on the heart: (1) by constriction of the coronary vessels, which lessens the

flow of blood to the heart muscle; (2) by inducing a great rise of blood pressure, which throws an additional burden on the heart and consequently slows the pulse; and (3) by a direct depressant action on the heart muscle.

I think the alarming symptoms experienced by these two doctors were due to the above actions of pituitrin on hearts which had been damaged previously from some cause.

Personally, I have given about 100 intravenous injections of pituitrin. In some cases 1 c.c. and in others $\frac{1}{2}$ c.c., along with normal or hypertonic saline, were given according to the indications in collapse of cases of gastro-enteritis. In not one single case have I met with any of the above alarming symptoms consequent on the intravenous use of pituitrin. I admit I have never given pituitrin in the pure form, undiluted, intravenously, but I can safely assert that pituitrin given in a dilute form will never cause any unpleasant symptoms.

According to present-day therapeutics pituitrin is one of the most potent and valuable drugs, especially in a case of emergency. To condemn such a useful drug for intravenous use without knowing its pharmacological actions is very unjust. One must be very careful and think twice before administering pituitrin when there is any affection of the heart muscle present.—Yours, etc.,

Y. S. ROW, L.M.P.

ALIPURAM JAIL HOSPITAL, BELLARY.
19th June 1925.

Service Notes.

APPOINTMENTS AND TRANSFERS.

Colonel A. A. Gibbs, I.M.S., to be Honorary Physician to the King, Indian Military Forces, *vice* Major-General J. Jackson, C.I.E., M.B., I.M.S. (Retired), 24th September 1924.

Colonel E. L. Perry, D.S.O., I.M.S., to be Honorary Surgeon to the King, Indian Military Forces, *vice* Colonel F. Wall, C.M.G., I.M.S. (Retired), 5th March 1925.

Lieutenant-Colonel K. V. Kukday, I.M.S., Officiating Surgeon-General with the Government of Bombay, is appointed to be Inspector-General of Civil Hospitals, Central Provinces, with effect from the date on which he assumes charge of his duties.

The services of Major R. V. Morrison, M.D., I.M.S., are placed temporarily at the disposal of the Government of Burma, with effect from the date on which he assumes charge of his civil duties.

Major J. Morison, M.B., I.M.S., is appointed to officiate as Director, Bombay Bacteriological Laboratory, with effect from the date on which he assumes charge of his duties.

The services of Captain T. H. Thomas, I.M.S., are placed temporarily at the disposal of the Government of the Punjab for employment as Superintendent, Punjab Mental Hospital, Lahore, with effect from the date on which he assumes charge of his duties.

The services of Captain G. B. Hanna, I.M.S., are placed temporarily at the disposal of the Government of Bengal, for employment in the Jail Department, with effect from the date on which he assumes charge of his duties.

The services of Captain K. R. Rao, I.M.S., are placed temporarily at the disposal of the Government of Madras, with effect from the date on which he assumes charge of his civil duties.

PROMOTIONS.

Lieutenant-Colonel (now Major-General) H. J. K. Bamfield, C.R., D.S.O., K.H.P., to be acting Colonel, while holding the appointment of Assistant Director, Medical

Services, 5th Cavalry Division, Egyptian Expeditionary Force, from 12th February 1919 to 28th February 1920.

Major (now Lieutenant-Colonel) J. S. O'Neill, M.C., M.D., I.M.S., is granted the acting rank of Lieutenant-Colonel from 27th December 1915 to 12th January 1916 whilst serving with an Indian Field Ambulance in Mesopotamia.

Captain (now Lieutenant-Colonel) J. S. O'Neill, M.C., M.D., I.M.S., is granted the acting rank of Major from 29th April to 5th May 1915, whilst serving with an Indian Field Ambulance in France.

To be Captain.

Malcolm Frank Douglas Graham, 22nd December 1923, but to rank from 13th July 1923. London Gazette notification dated 11th January 1924, is hereby cancelled).

We congratulate the following whose names appeared in the last Birthday Honour's List.

C. S. I.

Major-General T. H. Symons, Surgeon-General, Government of Madras.

C. I. E.

Lieutenant-Colonel R. P. Wilson, Offg. Surgeon-General, Government of Bengal.

Lieutenant-Colonel C. A. F. Hingston, Superintendent, Government Hospital for Women and Children, Madras.

Khan Bahadur Behramji Hormasji Nanavati, Medical Practitioner, Ahmedabad.

C. B. E.

(Civil Division).

Major A. J. H. Russell, Director, Public Health, Madras.

O. B. E.

(Military Division).

Major J. Scott, D.S.O., I.M.S.

Senior Nursing Sister Miss M. Wardell, Queen Alexandra's Military Nursing Service for India.

M. B. E.

(Civil Division).

Agnes Dorothea, Mrs. Haskell, St. John's Ambulance Nursing Division, Bengal.

Major H. Mansfield, Deputy Superintendent, Campbell Medical School and Hospital, Calcutta.

Saravaiya Amritraj Esquire, Health Officer, Civil and Military Station, Bangalore.

Lieutenant J. C. Chalke, Assistant Surgeon to His Excellency the Governor of Bengal.

Subedar-Major Barkat Ram, Bahadur, Indian Medical Department.

Kaisar-I-Hind Medal (First Class).

Miss W. Spicer, Lady Superintendent, Lady Minto's Indian Nursing Association and Matron of the Railway Hospital, Ajmer, Rajputana.

Dr. E. G. Bare, Clara Swain M. E. Mission Hospital, Bareilly, United Provinces.

Mother Henrietta in charge of the Nurses at the Ranchi Sadar Hospital.

Dr. E. L. Young, in charge, Palwal Mission Dispensary, Gurgaon District, Punjab.

Kaisar-I-Hind Medal (Second Class).

Doctor (Miss) Rukmabai, Zenana Medical Officer, Kathiawar, Western India States Agency.

Miss W. E. Walters, Lady Superintendent, Civil Hospital, Karachi, Bombay.

Miss A. Burton, Lady Superintendent, Lady Minto's Indian Nursing Association, Murree, Punjab.

Rao Sahib C. M. Mudaliar, Private Medical Practitioner, Secunderabad, Hyderabad, Deccan.

Babu Hari Mohun Mukherji, Medical Practitioner and Chairman, Krishnagar Municipality, Bengal.
Miss Elizabeth Mary Newman, Nurse, Rainawari Hospital, Kashmir.

Khan Bahadur.

Assistant Surgeon Khan Sahib Mir Hidayat Ullah, Medical School, Amritsar.

Rai Bahadur.

Babu Nani Lal Pan, Upper Bengal Medical Service, Professor of Anatomy, Medical College, Calcutta.
Rai Sahib Sarup Narayan Mathur, Civil Surgeon, Unao, United Provinces.
Babu Sanat Kumar Barat, Civil Assistant Surgeon, Bihar and Orissa.
Honorary Captain Rai Sahib Maharaj Krishna Kapur, Practitioner, Lahore.

Rao Bahadur.

M. R. Ry. Arcot Lakshmanaswami Mudaliyar Avargal, Assistant Superintendent, Government Maternity Hospital, Madras.

Shifa-ul-Mulk.

Hakim Abdul Hamid, Physician, Lucknow.

Sardar Sahib.

Assistant Surgeon Bhai Sohan Singh, Medical School, Amritsar.

Khan Sahib.

Muhammad Omar Sahib Bahadur, Senior Assistant, King Institute, Guindy, Madras.
M. Muhammad Hakimullah, Sub-Assistant Surgeon, North-West Frontier Province.
Subadar Major Raffi-ud-din, Indian Station Hospital, Abbottabad.

Rai Sahib.

Pundit Nilambar Joshi, Medical Officer, in charge of the Hatras Dispensary, Aligarh District, United Provinces.

Babu Lekh Raj Singh, Sadar Hospital, Aligarh.
Shadi Ram Sondhi, Sub-Assistant Surgeon, Baluchistan.

Rao Sahib.

M. R. Ry. Bonaventura Colaco Avargal, Civil Apothecary (Retired), Mangalore, Madras Presidency.

Ahmudan-gawng Tazcik-ya-Min.

U. San Kyaw, Sub-Assistant Surgeon, Mandalay, Burma.

NOTICES.

A NEW ZEISS MICROSCOPE.

MESSRS. CARL ZEISS have recently issued a new microscope suitable for advanced research workers. This is a large stand suitable for photomicrography, the body tube is large, the fine adjustment is of the New Meyer clockwork type, and in other respects the instrument is similar to the well-known large Zeiss models.

It is pleasing to note that microscopes of the highest class are once more available at about pre-war prices.

Full details of this and other microscopes can be had from the Agents, Messrs. Adair, Dutt & Co., Ltd., 5, Dalhousie Square, East, Calcutta.

ANTIPHLOGISTINE.

We have received from the Denver Chemical Manufacturing Company, 20, Grand Street, New York, U. S. A., a sample of the well-known and popular product known as antiphlogistine. This is very widely used by medical men in India and needs no special introduction to our readers, all of whom must be familiar with the use of antiphlogistine in the treatment of inflammatory conditions.

'HYPOLOID' BISMUTH METAL.

'HYPOLOID' Bismuth Metal in Isotonic Glucose Solution (0.2 gm. in 1 c.c.) is prepared by Burroughs, Wellcome & Co., to provide specialists and general practitioners with an additional weapon in their campaign against syphilis.

It presents metallic bismuth—now recognised as a definite spirillicide—in the form best suited for intramuscular injection and removes several objections which have militated against the use of some other bismuth preparations. The isotonic glucose solution allows uniform absorption to take place and practically eliminates abscess formation if the usual technique for intramuscular injection is observed.

The required dose is drawn up direct into the syringe barrel by puncturing the rubber cap with the syringe needle and withdrawing the piston to the requisite mark on the barrel. On withdrawing the needle the aperture in the rubber cap closes automatically and reseals the container.

Burroughs, Wellcome & Co., announce two sizes of 'Hypoloid' Bismuth Metal in Isotonic Glucose Solution, No. 556—1 c.c. Rubber Capped Bottles and No. 527,—10 c.c. Rubber Capped Bottles. The commencing dose suggested is 1 c.c. at each injection.

BRITISH MEDICAL ASSOCIATION MEETING, BATH 1925.

"Tabloid" "Iodidin" gr. 3 presents the same chemical substance—calcium iodo-ricinoleate—as a capsule product, and each product secures the administration of 1 gr. of iodine. "Ethidol"—ethyl iodo-ricinoleate—is an allied product containing 20 per cent. of iodine for use by innunction or by injection into sinuses or cavities.

Amongst additions to the list of "Tabloid" products "Tabloid" Digitalis Leaf, which presents the whole substance and activity of selected digitalis leaves and which is, in the opinion of many clinicians, more reliable than fluid digitalis preparations and "Tabloid" Hexamine and Methylene Blue were particularly to be noted.

The pioneers of "Kharsivan," the first British Salvarsan, have introduced recently a new member of the arsenobenzol series which greatly facilitates the technique of administering these powerful spirillicides. This is "Kharsulphan" which may be given hypodermically or intramuscularly, and which will be specially welcomed by practitioners as a reliable antisyphilitic obviating the elaborate technique for intramuscular injection.

Publishers' Notice.

SCIENTIFIC Articles and Notes of interest to the profession in India are solicited. Contributors of Original Articles will receive 25 reprints *gratis*, if asked for at the time of submitting their manuscripts.

Communications on Editorial Matters, Articles, Letters and Books for Review should be addressed to THE EDITOR, *The Indian Medical Gazette*, c/o Messrs. Thacker, Spink & Co., P. O. Box 54, Calcutta.

Communications for the Publishers relating to Subscriptions, Advertisements, and Reprints should be addressed to THE PUBLISHERS, Messrs. Thacker, Spink & Co., P. O. Box 54, Calcutta.

Annual Subscription to "The Indian Medical Gazette," Rs. 16 including postage, in India. Rs. 18 including postage, abroad.

Papers and articles forwarded for publication are understood to be offered to the *Indian Medical Gazette* alone, and any breach of this rule will be followed by non-publication.

The Editors of the *Indian Medical Gazette* cannot advise correspondents with regard to prescriptions, diagnosis, etc., nor can they recommend individual practitioners by name, as any such action would constitute a breach of professional etiquette.

Original Articles.

ACUTE INFLAMMATION OF THE PROSTATE.

By HENRY SMITH, C.I.E.,

LIEUTENANT-COLONEL, I.M.S. (Retd.),

Sidcup, Kent.

THIS is a subject which receives very little consideration in books dealing with genito-urinary diseases. One would think when reading the sections dealing with this subject that this disease must be very rare. In actual practice this is not the case.

I have operated on as many as three cases which came in on the same morning. It may not be just so frequent as this might suggest; at the same time acute inflammation of the prostate is more frequently misdiagnosed than any other case in surgical practice. The result of this is that the case is temporised with and allowed to declare itself by an abscess opening into the rectum or into the bladder.

Many years ago when I was stationed at Jullundur, the wife of a clergyman of my acquaintance in the West of Ireland wrote to me at the dictation of her husband that a few days previously he had driven some ten Irish miles on an outside car, exposed to storm and sleet the whole way; that that night he had to send for the doctor on account of retention of urine; that he had emptied the bowels as there was a desire to do so. Though the urine was periodically drawn off there was a constant desire to go to stool though the bowels were empty—also constant pain in the breech. He was 45 years of age. I wrote to her by return post saying that it was a characteristic case of acute inflammation of the prostate and that the local doctors would, of course, deal with it.

Such was not the case. Two general practitioners were in attendance and the nearest consulting surgeon was called in. The wife pressed for a diagnosis as the case was not doing well, but she could get none. Then she insisted on having a consultant from Dublin (these men are all since dead) to which they gave way. When he arrived he passed a finger into the rectum to find that the abscess had burst into the rectum. My letter had just arrived and was put into his hand. He left saying that all would now be well. It was thus about six weeks from the beginning of the illness till it burst. All was not well. The patient died within three days. It is not to be inferred that such failures in diagnoses occur only in Ireland. I know an important Indian official (European) who,

when on leave in England, went into a nursing home in London and had seen a number of consultants who also temporised. The patient set out for India and the abscess burst in the Suez Canal.

The above case presented the usual symptoms:—Rapid onset of retention in a man between 20 and 60 years of age, with pain in the breech and *tenesmus of the rectum*. In drawing off the urine we find no obstruction and no stone. A finger in the rectum in the early stage does not give much information as the capsule of the prostate is dense. After a few days the prostate will feel enlarged. On the group of symptoms above detailed, I have no hesitation in operating and I have never been deceived by them.

The tenesmus of the rectum is the most characteristic of the group.

In operating, I pass a scalpel on the flat from the perineum just in front of the rectum until I reach the prostate and then tilt up the point into the prostate and make a transverse cut in it and enlarge the wound when withdrawing the knife. In doing this the bladder need not be opened.

In those cases which burst into the bladder or rectum, the usual doctrine is that they should be left to drain by that route without further interference. This, in my opinion, is quite wrong.

If the abscess bursts into the bladder, the irritation causes the sphincter to contract and the retention remains and has to be relieved by frequently passing a catheter. The abscess cavity is thus being kept distended with urine which we know to be a very poisonous substance in any such cavity. The same applies to the rectum. The sphincter will contract from the irritation of the pus and the cavity will be pumped full of faecal gases.

The proper procedure (when the abscess has burst into the bladder) is to pass a lithotomy staff and make a small lithotomy-sized wound and drain both bladder and abscess. In case it empties into the rectum, the sphincter should be freely incised and the front wall of the rectum right up to and into the abscess cavity. The proper treatment, of course, is to open the abscess long before it would open of itself.

Causation.—Gonorrhoea is said to be the great cause of this condition. In my experience this is not correct.

ASEPSIS.

By H. HALLILAY,

LIEUTENANT-COLONEL, I.M.S.,

Civil Surgeon, Simla.

If one were asked to describe the difference between the surgical practice up to 1865 and that

which was founded upon the discoveries and principles established by Lord Lister, the answer could be given in one word, "asepsis."

If, however, one were asked how many surgeons personally supervise the sterilising arrangements upon which the achievement of this asepsis is founded he would probably express a pious hope that they all do so.

Yet to quote Macaulay's famous sentence respecting another matter, "unless we greatly err, this subject is to most readers not only insipid but positively distasteful."

I remember once during the war being shown over a recently commissioned hospital-ship by an enthusiastic medical officer who displayed with pride the equipment of the handsome operating theatre.

In the course of my visit to the theatre I happened to ask him at what pressure he was accustomed to sterilise his aseptic dressings, swabs, etc. I shall not readily forget the accents of cold disgust in which he replied "I leave all that sort of thing to the theatre sister."

I think we should not be wrong in assuming that Lord Lister would not have left "that sort of thing" to the discretion of a subordinate.

The Duke of Wellington was accustomed to say when reviewing his achievements as a general, "if I blundered I could always rely on my men pulling me through."

If in a more restricted battle-field a surgeon blunders he can usually rely upon the immense powers of resistance latent in the tissues of the human body to bacterial invasion to cover up any faults of omission or commission in his aseptic ritual.

Is every instance of the occurrence of sepsis in a "clean" operation due to auto-infection?

Sometimes the infection is too heavy and the virulence of the organisms inadvertently introduced by the surgeon so intense that even the heroic resistance of the tissues is overwhelmed.

It is on these occasions that the surgeon comes into unfavourable comparison with the bacteriologist, whose aseptic standards are demonstrably higher.

"What the eye does not see the heart does not grieve after" and the heart of the surgeon is often spared from grieving because his eye has not seen the silent struggle in the tissues from which the victory has emerged which has blotted out all record of his errors.

On the other hand the bacteriologist has no such allies. He stands or falls by the completeness or otherwise of the precautions which he has taken to prevent the contamination of his media; inevitable disaster and exposure follow the smallest mistake.

His media have no inherent powers of resistance to the growth of micro-organisms, on the contrary they are especially designed to foster and encourage such growth.

What bacteriologist would rely on the feeble

and inadequate means for effecting asepsis which satisfy too many surgeons?

When one hears of a "clean" operation going wrong, when a patient who light-heartedly entered a nursing home to undergo an operation which he was assured would prevent him from following his usual pursuits for at most a few weeks is condemned to months of fever, insomnia, pain, the risk of an incisional hernia, of death itself, the failure of the operation because there was a breakdown in the aseptic arrangements, can any precaution, any care be considered too meticulous?

If every one of these septic misadventures were made the subject of an official inquiry by a properly constituted court as is done after a naval disaster, we should hear of fewer of these regrettable incidents which at present disfigure too often the fair fame of aseptic surgery; certainly the attitude of the profession at large to them would become far less tolerant.

When the cult of asepsis displaced that of antiseptis in the ritual of surgical operations all over the world, and the plain gauze swab sterilised by steam at high pressure ousted the marine sponge saturated in some germicidal solution from its pride of place, then the H.P. (high pressure) steriliser came into its kingdom. Its importance indeed in the aseptic scheme can hardly be exaggerated. On it depends the sterility of the gauze swabs which are actually introduced into the wound, the towels which are clipped to its edge, the aprons of the surgeon and his assistants, and frequently the gloves which cover their hands.

If for any reason it fails to sterilise and organisms are inadvertently introduced into the wound, the only protection against disaster is the resistance of the patient's tissues.

The modern H.P. steriliser as supplied by the surgical instrument manufacturer is usually provided with a manometer to register the pressure and a thermometer to record the temperature. The reading on these instruments relates to the temperature and pressure in the chamber of the steriliser, those obtaining in the middle of the drum amongst the towels and dressings may be widely different. What the manufacturer does not provide is any means of gauging the temperature to which the dressings have been subjected inside the drum.

In view of the fact that it is possible to expose the outside of a drum to a temperature of 121°C. and for the temperature within the drum to rise only to 97°C. after 10 minutes, it is obvious that a pyrometer which registers the maximum temperature arrived at in the middle of the drum is a desirable safeguard.

Various pyrometers have been suggested; some, such as flowers of sulphur, which show a change of form as soon as the required temperature is reached. Sulphur, for example, melts at 114.5°C.

Others are of the nature of colour indicators, changing colour at a constant temperature specific for the substance. The use of tubes of phthalic acid has been recommended; this

substance is said to turn bright red at high temperatures. I have no experience of this compound but according to Black (1925) it does not work satisfactorily in practice, for this author states that after carrying a packet of it in his waistcoat pocket for a few hours it developed a fiery red!

Others again depend on a combination of the two foregoing devices such as a mechanical mixture of antifebrin and methylene-blue in the proportion of 2 grains of the latter to 1 ounce of the former.

This mixture is said to remain white up to a temperature of 230°F. (110°C.) when it develops an intense blue colour. Obviously the test depends on the dye going into solution as soon as the antifebrin melts and on its diffusion throughout the crystals. The melting point of antifebrin is officially 114°C., but this of course means that of the drug in a chemically pure state; the admixture of the methylene-blue naturally alters the melting point. I have tested this indicator and find that many fallacies are involved in its use. In the first place it can only be used in sealed glass capsules because the mixture turns a vivid blue at the faintest trace of moisture. Secondly, it does not turn blue at 110°C. but at 105°C. These results were arrived at after testing the mixture very carefully with a thermometer specially made for these experiments by Mr. S. Woodhouse, Officer-in-Charge, Mathematical Instrument Office, Calcutta, for whose great trouble and kindness in this connection I take this opportunity of expressing my most grateful thanks.

The ideal indicator, if one is to come into general use, should be cheap, easily available, not altered by moisture so as to necessitate the provision of glass capsules and of a melting point of 114°C.

An indicator answering to these requirements is to be found in powdered sulphur which melts at a temperature of 114.5°C., is unaffected by moisture and is to be found in every hospital and dispensary all over the civilised world.

A small paper packet of flowers of sulphur placed in the middle of the dressings to be sterilised will set the mind of the most conscientious surgeon at rest if, on opening the drum, he finds that the sulphur has fused. He can at any rate rely upon it that the swabs and dressings he is about to use are above reproach as regards sterility.

This device safeguards the dressings and the swabs inside the drum. A further one is desirable. I refer to the chance of the drum being opened by any unauthorised person after the sterilisation is complete.

This again can be effected by the use of a sulphur seal. Make up some starch paste by pouring boiling water on starch, the water must be boiling as otherwise the capsule of the starch granule will not burst, stir in an equal quantity of sulphur powder and paste a couple of strips of paper over the lid on to the side of the drum.

If the sterilisation has been properly carried out the sulphur in the paste will melt and seal the paper on to the lid and sides of the drum so that it will be impossible to open the drum without breaking the seal.

It may be objected that these precautions are unnecessary and irritating, but after all they are fewer and simpler than the safeguards employed by a bank in its own protection when dealing with the transfer of valuables or securities, and in view of the magnitude of the issues at stake can any precaution be considered excessive?

Theoretically, those to whom this highly important operation of sterilising is entrusted are infallible. Theoretically, all are honest until they are proved to be rogues, but does any one in the knowledge of this axiom of British law consider that he is justified in resenting the conduct of a bank manager in demanding a signed receipt before he will cash a cheque for the most valued and respected client?

The business of sterilising is of so important a nature that it should be conducted with the vigilance and severity with which a bank manager conducts the business of his bank, nothing should be taken on trust and nothing left to chance.

The next fallacy with regard to sterilising lies in the fact that if the drums are packed too tightly the rate of heat penetration is very greatly slowed, in fact, it is possible to conceive of a degree of tightness which would prevent the heat penetrating at all.

If Table III be consulted it will be seen that a tightly packed drum if exposed to a temperature of 121°C. for 10 minutes will only register a temperature of 97°C. in the centre of the dressings.

This of course would be an entirely inadequate temperature should the dressings or swabs have been contaminated by spores or spore-forming organisms though it would probably be sufficient for the ordinary pyogenic organisms.

The temptation to overload steriliser drums is great, because the type of steriliser usually found in hospitals and institutions is far too small and in order to get the drums sterilised up to time there is a tendency to pack the drums to their utmost capacity short of bursting the hinges off the lids, and worse still, to cut short the time of exposure.

It is to be borne in mind that it is the practice in many institutions and nursing homes to cut up ordinary gauze or muslin and to use it for swabs and dressings after they have been sterilised in the institution steriliser. When one considers the possibility of contamination in the manufacture and transport of these fabrics, sure indeed must he be of the efficiency of his sterilising arrangements before he dare introduce any of this material into the abdominal cavity of his patients.

If the fourth experiment in Table IV is referred to it will be seen that after an exposure of 30 minutes to a temperature of 129°C. the

temperature in the middle of the drum rose only to 117°C. a "lag" of about 12°C. as regards temperature. If the results in Table III are studied it will be seen that the "lag" as regards time is about 11 minutes, in other words it takes 11 minutes even at the comparatively high pressure of 20 lbs. for the temperature in the middle of the dressings to reach 114°C., the temperature outside the drum being 126°C.

Experiments (1), (2) and (3) in Table II show that it is possible to obtain a vigorous growth of anthrax and of the spore-forming rice bacillus after an exposure of 10 minutes to a temperature of 115°C.; the culture of staphylococcus was however killed.

CONCLUSIONS.

(1) The majority of H.P. steam sterilisers are too small, from this arises a temptation to overload the drums, this overloading results in a proportionate slowing down of the rate of penetration of heat to the centre of the dressings. It also leads to a tendency to cut down the time of exposure to a minimum varying with the limitations imposed by the conscience or aseptic tenets of the person in charge of the sterilising operations.

(2) The pressure at which so-called H.P. sterilisers are worked is too low to give a comfortable margin of security; a pressure of 30 lbs. is necessary.

(3) To ensure absolute safety and certainty it is most desirable to provide every steriliser drum with a cheap and efficient pyrometer.

Such a pyrometer is to be found in a small packet of flowers of sulphur which should be introduced into the middle of the dressings. A piece of black thread tied to the centre of the packet and leading to the top of the dressings will enable it to be withdrawn without disturbing the contents of the drum. This should be done as soon as the drum is opened.

(4) A set of rules should be drawn up, printed in large type, framed, and hung up in a conspicuous position in the sterilising room. These rules should prescribe in the clearest language the pressure at which the steriliser is to be worked, the time of exposure of the drums after the desired pressure is registered by the manometer and, most important of all, the number of articles which can be introduced into any one drum without dangerously retarding the rate of penetration.

The rules might appropriately end with the following warning:—"It is easier for a rich man to enter the Kingdom of Heaven than it is to sterilise dressings at the centre of a tightly packed drum."

I desire to express my obligation to Major H. W. Acton, I.M.S., for many valuable suggestions in connection with this paper and for his assistance in the bacterial portion of the research which I could not have carried out without his help. Also to Dr. K. Banerji, M.B., D.T.M., for the

sacrifice of much of his own time in supervising these experiments.

REFERENCE.

Black, K., 1925.—A Weak Point in Sterilising Methods. *British Med. J.*, January 31st, p. 210.

TABLE I.

Series of experiments showing results of exposure of rice bacillus spores to varying temperatures in an H.P. (high pressure) steriliser,—capsule of flowers of sulphur used as pyrometer.

| Temperature. | Exposure. | Growth. | Sulphur. |
|--------------|------------|---------|------------|
| (1) 115°C. | 10 minutes | Yes | Not fused. |
| (2) 121°C. | 10 minutes | Yes | Not fused. |
| (3) 126°C. | 10 minutes | No | Fused. |
| (4) 115°C. | 30 minutes | Yes | Not fused. |

Note.—The steriliser drug was filled with surgeons' aprons but not so tightly packed that the lid would not close without force. The spores were placed in the middle of the dressings and the flowers of sulphur in sealed tubes by the side of the spores. The organism was a spore-forming bacillus isolated by Major Acton in connection with his beriberi research.

TABLE II.

Results of exposure of anthrax spores, rice bacillus spores and staphylococcus to various temperatures in an H.P. steriliser. Sulphur pyrometer.

| Temperature. | Exposure. | Anthrax spores. | Staphylococcus. | Rice bacillus. | Sulphur. |
|--------------|-----------|-----------------|-----------------|----------------|----------|
| (1) 115°C. | 10 mins. | Growth | .. | .. | Unfused. |
| (2) 115°C. | 10 mins. | .. | .. | Growth | Unfused. |
| (3) 115°C. | 10 mins. | .. | No growth | .. | Unfused. |
| (4) 115°C. | 30 mins. | No growth | .. | .. | Unfused. |

Note.—The anthrax spores used in these experiments were found to survive boiling for 35 minutes.

TABLE III.

Series of experiments showing "lag" time as regards the rate of penetration of heat into a well packed drum. In this series of observations two sulphur pyrometers were employed, one on the outside of the drum and the other in the centre of the dressings.

| Pressure. | Time. | Outside capsule. | Inside capsule. | Temperature. |
|-------------|-----------|------------------|--------------------|--------------|
| (1) 15 lbs. | 10 mins. | Sulphur fused. | Sulphur not fused. | 120°C. |
| (2) 15 lbs. | 2 mins. | Do. | Do. | 120°C. |
| (3) 20 lbs. | 2.5 mins. | Do. | Do. | 126°C. |
| (4) 20 lbs. | 7 mins. | Do. | Do. | 126°C. |
| (5) 20 lbs. | 9 mins. | Do. | Do. | 126°C. |
| (6) 20 lbs. | 10 mins. | Do. | Do. | 126°C. |
| (7) 20 lbs. | 12 mins. | Do. | Sulphur fused. | 126°C. |

Note.—It takes therefore about 11 minutes for even such a comparatively high temperature as 126°C. to penetrate to the middle of a moderately tightly packed steriliser drum.

TABLE IV.

Series of experiments with sulphur pyrometer in which the temperature inside the drug was recorded by a mercurial thermometer.

| Temperature. | Time. | Outer capsule. | Inner capsule. | Thermometer in drum. |
|---|----------|----------------|--------------------|----------------------|
| (1) 115°C. | 10 mins. | Sulphur fused. | Sulphur unchanged. | 97°C. |
| (2) 115°C. for 20 mins. raised to 123°C. for 10 mins. | | Do. | Sulphur fused. | 119°C. |
| (3) 120°C. | 10 mins. | Do. | Sulphur unchanged. | 97°C. |
| (4) 129°C. | 30 mins. | Do. | Sulphur fused. | 117°C. |

Note.—In experiment (2) the drum was purposely loosely packed, in experiments (1), (3)

and (4) the drums were tightly packed. These experiments show that even with such a high temperature as 120°C. operating for 10 minutes the temperature in the centre of the dressings is only 97°C. in a tightly packed drum. On the other hand, with a temperature of 129°C. acting for 30 minutes the temperature recorded by the special thermometer recorded 117°C.—a "lag" in temperature of about 12 degrees.

This result points the moral that to secure a comfortable margin of security the temperature at which the sterilisation is conducted should be far in excess of that usually employed.

A temperature of 129°C. entails a pressure of 30 lbs. to the square inch though this is a great deal higher than many of the so-called H.P. sterilisers on the market are designed to stand.

THE STAPHYLOCOCCAL KIDNEY IN CHILDHOOD.

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THE physician who is called upon to treat any considerable number of children cannot fail to be impressed with the vulnerability of the kidney in early life.

All types of infection of the upper urinary tract are met with, from the fulminating septicæmic type to *B. coli* infections, at times dangerous to life, but occasionally so mild in effect as to give rise only to occasional attacks of possibly unexplained fever.

The septic kidney of childhood may be clinically classified as follows:—

1. The pyelitis and pyelonephritis of infancy.
2. Intercurrent infection in the course of an acute generalised bacterial infection, as in typhoid.
3. Infection by the *B. coli* group in older children.
4. Infection by pyogenic organisms, more commonly staphylococci, secondary to infection of the tonsils, in older children.

This article is written with the object of calling attention to a particular and dangerous group which is the staphylococcal pyelitis and pyelonephritis of early childhood, in which there is direct evidence of a primary focus of infection, that infection being the tonsil.

It is of prime importance that these cases should be recognised early, as on such recognition depends the ultimate result.

The following four cases will serve to illustrate the type. In three of these cases there is definite evidence that the tonsil was the primary focus, and in the fourth the evidence is rather more than presumptive. They constitute further evidence of the gravity of acute tonsillar infections in children.

These particular cases ended happily, but it is not always thus; there are fulminating cases,

accompanied by septicaemia, which progress rapidly to a fatal termination.

A feature of two of the cases is the marked acetone reaction in the urine in the early stages of the disease. It is presumed that this has no special significance, but it is the acetonuria which often accompanies the onset of acute diseases in children to which, conceivably, the occurrence of convulsions may be attributed.

At the same time, such acetonuria cannot be neglected, and it is perhaps wise to direct the attention to this in the first instance, lest convulsions or coma should supervene.

Case 1.—D. G., aged 7. The patient was involved, with many others, in an outbreak of food poisoning at an hotel. The remainder recovered after twenty-four hours or so, but this patient developed a temperature of 103° F. which persisted.

The child did not look seriously ill and, excluding the temperature, manifested no abnormality other than a suspicious brightness of the eyes and a definite tenderness in the left lumbar region.

Examination of the urine revealed pus cells in abundance and a pure culture of *Staphylococcus albus*.

The history of the case is suggestive. Some two months previous the tonsils had been removed on account of repeated attacks of tonsillitis. The child had complained periodically of pain in the back, which was accompanied by transient fever. These attacks had been attributed to "biliousness" and no professional opinion invited. The case was treated with urinary antiseptics; the temperature was subnormal on the fifth day. Within a fortnight the urine was free from staphylococci.

A second culture taken fifteen days later was negative, and the child, last seen eight months after the attack, had had no recurrence.

Case 2.—M. W., aged 5. Brought up for examination on account of a tendency to violent coughs and a general failure to progress.

The child had periodic attacks of severe tonsillitis with fever; the tonsillar glands were markedly enlarged and there was a chain of enlarged glands down the neck.

Early tonsillectomy was advised but postponed as the child was proceeding to England shortly.

The later history of the case was related by the mother. Shortly after arrival in England the child was seriously ill with persistent fever and pus in the urine. It was decided, after some days in which the disease steadily progressed, that it was hopeless to wait for any improvement before removing the tonsils, so tonsillectomy was performed. The tonsils were found to be deeply pocketed with pus.

The child eventually made a good recovery though the temperature and pus in the urine persisted for some time.

When seen by the writer in India some eight months later, the child was making good progress in every way, the urine was sterile and in other respects normal. Incidentally, the chain of enlarged glands had entirely subsided.

Case 3.—M. A., aged 4½ years. The child on first inspection appeared extremely ill; the temperature was 104° F., the pulse fluttering, and the patient vomiting and drowsy. There was a strong smell of acetone in the breath.

The urine, on examination, in addition to acetone, contained much pus and the presence of an abundant growth of *S. albus* was revealed on culture.

In this case there was not a very definite history of tonsillitis; it was impossible to see the tonsils, but there was slight enlargement of the tonsillar glands.

The child was treated for the first twenty-four hours with mixed alkalis and after that with urinary antiseptics.

The temperature was normal at the end of a week. Ten days after the onset of the disease the laboratory reported "very few colonies of *S. albus*". A fortnight later the urine was reported as sterile.

Case 4.—P. H., aged 6. Brought up for consultation on the grounds that the child was listless, restless, sweated at night, and had a capricious appetite. There had been several attacks of unexplained fever.

On physical examination no cause could be found except some carious teeth and slight evidence of intestinal dyspepsia. The tonsils were large but appeared clean. The urine revealed pus cells in abundance and a culture of *B. coli* was obtained.

The child was treated with alkalis and made good progress, but in January 1925 the urine, though free from *B. coli*, was stated to contain streptococci. This was possibly a contamination.

The original symptoms had disappeared after two courses of alkali treatment and the child appeared well save for some cardio-vascular irritability.

In May 1925 the patient developed acute tonsillitis with extensive purulent patches on the tonsils, was very ill and in an intensely toxic state. *S. albus* was reported in large numbers as a result of the throat swab culture and in small numbers in the urine within forty-eight hours of the onset of the disease.

In this case there was definite tenderness in the left lumbar region, marked cardio-vascular irritability and an intense acetone reaction in the urine.

The first treatment was directed to the throat, at the same time mixed alkalis were given to neutralise the acetone, and later urinary antiseptics were given.

The temperature came to normal after 8 days and the urine, examined after 17 days, was reported sterile.

The diagnosis of such cases rests on the consideration of inherent probabilities; tenderness in the lumbar region is not invariable. The examination of the urine, even by the naked eye, will often suggest the site of the lesion.

Treatment.—These are cases which will do much to restore the waverer's faith in the efficacy of drugs. The timely exhibition of antiseptics may be expected to produce tangible results within a very short time. The following mixture is recommended:—

| | | |
|---------------------------|----|-------------|
| Hexamine | .. | grs. 3 to 5 |
| Acid sodium phosphate | .. | grs. 3 to 5 |
| Sodium benzoate | .. | grs. 3 |
| Quinine acid hydrochloric | .. | gr. ½ |
| Aqua ad. ½ oz. | | |

Four times a day, four hourly, and once in the night if the patient is awake.

The inclusion of quinine may call for criticism. Undoubtedly, if given in doses sufficient to secure an antiseptic concentration in the urine it is a powerful irritant to the kidney, but in small doses it is a diuretic and possibly adds its quota to the general antiseptic effect. Large quantities of fluid must be ingested.

The throat will, of course, call for special and careful treatment. Where patches are small and isolated, a mixture of equal parts of pure carbolic and camphor applied to the patches will accelerate their disappearance. The mixture, if heated during preparation, is not caustic.

Not the least important is the period of convalescence. It is held that the kidney is rendered susceptible to infections by slight trauma such as may be sustained in the vigorous movements of childhood. Bearing this in mind, it is clear that the patient must remain in bed for at least

ten days after the temperature has come down and the urine cleared.

Consideration of these cases raises the question as to whether it would not be wise, in all acute infections of the tonsils, to administer urinary antiseptics as a routine.

The offending tonsils must, of course, be removed as soon as the condition of the patient permits. It is well to remember that fatal cases of septicaemia—(the result of removing septic tonsils)—have been recorded, so time must be allowed for the subsidence of the infection and the development of some degree of immunity. The urine should be examined for recurrence every two months during the next year.

Finally, reasoning from analogy, it is for consideration whether the kidneys in acute exanthemata should not be treated with antiseptics in the hope that their involvement may be averted.

THE TRANSMISSION AND ETIOLOGY OF DENGUE: A CRITICAL REVIEW.

By ASA C. CHANDLER, M.S., Ph.D.

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IN a recent paper on the "Experimental Transmission of Dengue," by Silcr, Hall and Hitchens (1925), which was reviewed and discussed by Megaw in the *Indian Medical Gazette* for August 1925, these authors come to the following conclusions:—(1) That the disease is readily transmitted by *Aedes aegypti* (*Stegomyia fasciata*), a confirmation of previous work by Cleland, Bradley and MacDonald (1918) in Australia, and by Chandler and Rice (1923) in America (the latter work was overlooked by the authors); (2) that the patient is infective for mosquitoes for at least three days after the onset of the disease; (3) that the virus requires at least eleven days for development in the mosquito before the latter can transmit the infection; (4) that mosquitoes which have once become infective remain so for long periods of time, probably throughout the remainder of their lives; (5) that *Culex fatigans* can be eliminated as a transmitter; and (6) that dengue produces a refractory state of more or less incomplete immunity which does not compare in permanence or solidity with that conferred by yellow fever.

This excellent piece of work leaves no room for doubt but that *Aedes* (*Stegomyia*) *aegypti* is a very ready transmitter of dengue. This fact had previously been fairly well established by Cleland, Bradley and MacDonald and by Chandler and Rice on smaller series of experimental cases, and by a large volume of epidemiological evidence collected by many different workers in many different places. The work of Graham (1903) and of Ashburn and Craig (1907) which seemed to incriminate *Culex fatigans* is based on inconclusive evidence. Graham having worked with mixed species of mosquitoes, and Ashburn and Craig having obtained only a single apparently successful

transmission which is not entirely above suspicion. Chandler and Rice (1923) came to the conclusion, from a considerable mass of epidemiological evidence; that in the Texas epidemic of 1922 *Culex fatigans* played at best a very minor part in the transmission of the disease, and considered it highly improbable that the epidemic would ever have developed in the absence of numerous *Aedes* (*Stegomyia*) *egypti*, although they were not prepared to say that *Culex* might not, under some circumstances, be capable of transmission. The negative transmission experiments of Siler *et al.* seem quite definitely to set aside this species as a transmitter. It does not follow, however, that *Aedes* (*Stegomyia*) *egypti* is the sole transmitter; it should be recalled that Koizumi, Yamaguchi and Tonomura (1917) in Japan reported successful experimental transmissions by means of *Aedes* (*Stegomyia*) *scutellaris* and *Armigeres* (or *Desvoidya*) *obturbans*, and considered the former species to be the principal transmitter in Formosa, where *egypti* is of such sporadic occurrence as to be a negligible factor. Both these species are closely related to *Aedes* (*Stegomyia*) *egypti*, and *scutellaris* has been suggested as a possible vector for yellow fever in the Orient if this disease should be introduced into its area. It is by no means improbable that other mosquitoes of the *Aedes* group may prove to be efficient transmitters of dengue, especially such species as *A.* (*Stegomyia*) *pseudoscutellaris*, which are habitual human feeders.

The specificity of disease organisms to particular species of insect transmitters is an interesting question. As a rule the specificity is not absolute, i.e., not a single species but a number of more or less closely related species are usually found to be capable of harbouring and transmitting a particular virus. The ability of the virus to exist or undergo development in an insect vector is by no means the only factor which comes into consideration; the food habits of the insects may also be of great importance. Some *Anopheles*, for instance, which have been shown to be good nurses for malaria parasites experimentally are of no practical importance as malaria transmitters in nature, because they do not frequent human habitations and do not habitually feed on man. It is quite possible in the case of some disease germs that contact with non-human blood in an insect's digestive tract would prove injurious, thus limiting effective transmission to insects which habitually feed on human beings and to individuals which had not fed on non-human blood between the time of an infective meal and a subsequent potential transmitting bite. We know that pathogenicity of organisms may be altered by passage through different kinds of host animals, and it is possible that mere exposure to the blood of different host animals in an insect vector may have a similar effect. There is, in fact, some reason to believe that in some cases the insect

may serve as a sort of training camp for organisms of non-human origin where exposure to human blood under modified conditions may increase their tolerance to such an extent as to render human infection possible. Such a hypothesis may very well account for the origin of *Trypanosoma rhodesiense* and for the peculiar distribution of Chagas' disease in South America as compared with the distribution of *Trypanosoma cruzi*-like organisms (see Chandler, 1923).

Yellow fever stands out as an instance of a disease with a highly specific insect vector. But it is by no means certain that *Aedes* (*Stegomyia*) *egypti* is the sole possible transmitter of the disease. It happens that no other closely related mosquito (i.e., of the *Stegomyia* or *Armigeres* groups) which is common and habitually feeds on human beings occurs in the Western Hemisphere, hence transmission of yellow fever there is limited to the single available species. In West Africa *egypti* is the predominant species of its group, although *sugens* and *africana* both occur there; but I have been able to find no reference to any work which would indicate whether or not these species might also transmit the disease. If yellow fever should be introduced into the habitats of *scutellaris* and *pseudoscutellaris* in the Orient, which are very closely related to *egypti* and have similar habits, the writer ventures the opinion that these species, as well as *egypti* would have to be dealt with as transmitters of yellow fever.

The fact that dengue and yellow fever have been shown to be transmitted by the same group of insects does not necessarily indicate any close relationship between their respective viruses, any more than the transmission of Oriental sore and sandfly fever by *Phlebotomi*, or of typhus and relapsing fever by body lice indicate a relationship of the causative organisms of these diseases. Chandler and Rice (1923) have called attention to a number of significant differences between dengue and yellow fever and expressed the opinion that the supposed relationship of the two diseases has been over-emphasized. The finding of *Leptospira icteroides* in yellow fever and the failure of most workers to find a similar organism in dengue (see for example Chandler and Rice, 1923 and Knowles and Das Gupta, 1924) throws still further doubt on the relationship of the diseases in spite of their similar transmission. Couvy (1921) found scanty spirochaetes in the blood of a supposed dengue case two to three hours before the onset of the fever, and in 1922 reported the finding of spirochaetes both before and for 3 to 48 hours after the onset of fever in cases recorded as dengue but which appear not to be dengue but sandfly fever. De Faria (1923) records scanty spirochaetes in a single film taken from a dengue patient soon after the onset of fever, but in view of the observations of Knowles and Das Gupta (1924) on "pseudospirochaetes" in dengue blood, objects

which also puzzled the writer for some time but which were found to be due to fibrin, this observation must be accepted with some hesitancy. Whittingham (1922) records the isolation of spirochaetes in culture from 6 out of 26 cases of sandfly fever in Malta, but inoculation of the cultures into non-immunes failed to reproduce the disease; moreover, as Megaw has pointed out, it is doubtful whether Whittingham's cases were uncomplicated sandfly fever.

This brings up the question of the relation of dengue and sandfly fever, a point which Megaw (1923) has ably discussed. Clinically the diseases certainly overlap. It is not unlikely that the two diseases have closely related causative organisms, and it is even possible that the same virus may be involved, modified in its pathogenicity by development in mosquitoes on the one hand and in sandflies on the other. Couvy's observations in Syria lend some support to this view.

There is one important conclusion reached by Siler, Hall and Hitchens which must be accepted with reservations. Their view that the dengue virus requires eleven days or more for development in the mosquito before transmission can occur, based on three cases in which bites of infected mosquitoes failed to produce disease before eleven days' incubation but succeeded later, and on an unstated number of unsuccessful transmission experiments prior to an incubation of eleven days, is at variance with results obtained by Chandler and Rice, and also with epidemiological evidence. Chandler and Rice succeeded in transmitting the disease in 4 out of 6 cases with mosquitoes which had been infected 24, 48, 72, and 96 hours previously on patients in the first to fifth days of the disease; the human incubation period in these experimental cases varied from a little over 4 days to 6½ days. Every precaution was taken to prevent infection from outside sources, and the mosquitoes were laboratory bred. There is, of course, the possibility that infected mosquitoes were used for breeding purposes and that the virus is capable of transmission to the offspring of such infected mosquitoes. The results of Chandler and Rice are more in accord with the known epidemiology of the disease than are those of Siler *et al.* The rapidity of the spread of the disease is one of the outstanding features of dengue, and is hardly compatible with a necessary eleven-day incubation period in the transmitting agents, which would result in a much slower spread both on account of the time required for the mosquito to become infective and on account of the mortality of infected mosquitoes between the time of feeding on an infected individual and the development of infectivity. The conclusions reached by Siler *et al.* would certainly appear to be justified by the results obtained by them, and I am at a loss to explain the difference between their results and ours unless, as suggested above, congenital infection

of mosquitoes can occur. It is unfortunate that the previous work of Chandler and Rice was overlooked by the workers in the Philippines, since it might have suggested to them possible reasons for their failure to get transmission in shorter periods of time, and experiments to throw further light on the subject.

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SOIL ACIDITY AND SURVIVAL OF HOOKWORM LARVÆ.

By ASA C. CHANDLER, M.S., Ph.D.

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It is a prevalent opinion that acidity in soil has a tendency to shorten the life of infective hookworm larvæ, Hirst (1924), for instance, says "a markedly acid reaction is also most unfavourable to the continued survival of hookworm larvæ." and remarks that the most favourable pH reaction for the development of the larvæ in cultures from faeces requires investigation.

The fact that hookworm disease thrives on tea gardens where the soil has a markedly acid reaction, averaging about pH 5.5, led me to doubt whether, within the pH range of ordinary agricultural soils, the reaction had any marked effect on the survival of hookworm larvæ. The well known resistance of hookworm larvæ to weak chemical solutions,

and the lesser extent to which larvæ, living on the surface of soil, would be exposed to the injurious effect of acidity than would be the case when immersed in solutions, added weight to the doubt. The fact that immersion of infective hookworm larvæ even in a N/10 solution of hydrochloric acid failed to kill them in 18 hours when the temperature did not exceed 75°F., also suggested that the larvæ were not highly susceptible to acidity.

In order to test this point, four samples of soil with varying hydrogen-ion concentrations were placed in small galvanised iron tumbler-like receptacles, holding about 100 c.c. each. Six receptacles of each type of soil were placed respectively in four large pudding pans on a bed of cotton-wool, which was kept saturated with neutral distilled water. Holes were punched in the bottoms of the receptacles so that the soil contained in them could be kept moist by absorption of water from the bed of wet cotton-wool. Soils 1 to 3 were tea garden soils kindly sent to us by the Toklai Experiment Station in Assam. Soil No. 1 was an unaltered red clayey tea soil the pH concentration of which during the course of the experiment, tested by a colorimetric method each time that a sample was used for extraction of larvæ, varied from pH 5.2 to pH 6; soil No. 2 was a similar soil which had been treated with lime and had a pH which varied from 5.6 to 7; soil No. 3 was a similar soil which had been more heavily

same lot, freshly extracted from a 7-day old charcoal culture. Unfortunately the patient from whom the larvæ were obtained absconded after the experiment was started and before treatment could be given to determine whether the larvæ were those of *Necator*, *Ancylostoma* or both. The receptacles were kept uncovered in the laboratory, where the maximum daily temperatures usually ranged between 85°F. and 95°F. One receptacle from each group was examined for hookworm larvæ at intervals of two weeks until no more larvæ could be found, by placing the upper one inch of soil in a Bærmann apparatus for extraction of hookworm larvæ. A portion of the remaining deeper layer of soil was used for determining the hydrogen-ion concentration. The method employed was as follows:—To 12 gms. of moist soil was added 8 c.c. of neutral distilled water and the mixture poured into a collodion sac. The sac was immersed in a tube of slightly larger diameter containing about 12 c.c. of neutral distilled water. After dialyzing for one hour the sac was removed and the water in the tube tested for its pH concentration by a colorimetric method, brom-thymol-blue and methyl-red being used as indicators. All glassware used was boiled in acid shortly before being used in order to do away with alkalinity from the glass.

The results of the experiment are shown in the following table:—

| Date. | Soil No. 1. | | Soil No. 2. | | Soil No. 3. | | Soil No. 4. | |
|------------------|-----------------|-----|-----------------|-----|-----------------|-----|-----------------|------|
| | Hookworm larvæ. | pH. | Hookworm larvæ. | pH. | Hookworm larvæ. | pH. | Hookworm larvæ. | pH. |
| 10th April, 1925 | 2,000 | 6 | 2,000 | 6.7 | 2,000 | 6.9 | 2,000 | 7.2 |
| 24th " | 1,168 | 6 | 1,250 | 7 | 835 | 7.2 | 1,170 | 7.45 |
| 11th May, 1925 | 1,200 | 5.5 | 350 | 6 | 350 | 6.4 | 3* | 7.3 |
| 1st June, 1925 | 103 | 5.7 | 27 | 6.3 | 384 | 6.7 | 128 | 7. |
| 17th " | 413 | 5.2 | 73 | 5.6 | 286 | 6.3 | 155 | 7.4 |
| 1st July, 1925 | 2 | 6 | 6 | 7.1 | 45 | 6.1 | | 7.5 |
| 15th " | 0 | 6 | 0 | 7.1 | 0 | 6.8 | dried | .. |

* The soil in this receptacle became partially dry about two weeks previously.

treated with lime and had a pH varying from 6.1 to 6.7; soil No. 4 was a dark-coloured loamy soil obtained from the Calcutta Zoological Garden having a pH varying from 7.1 to 7.5. The cause for the different pH values for different samples of the same soil is not known, but may have been due to varying amounts of absorption of CO₂ or other gases from the atmosphere. On the surface of the soil in each receptacle there were placed approximately 2,000 larvæ on 10th April, 1925, at the height of the hottest weather in Calcutta. These larvæ were all of the

It was found to be difficult to keep an even degree of moisture in the receptacles, and it is probable that the variable results are due to a large extent to this factor. The receptacle from No. 4 examined on 11th May, 1925, for instance, had been noted as having partially dried. In general, however, it will be noticed that the reduction in numbers of larvæ took place at a rapid rate in all the soils, being reduced to an average of about 10 per cent. of the original number in 68 days and to about 0.3 per cent. in 81 days, while at the end of 96 days no more larvæ could be extracted.

Making allowances for the individual differences in the receptacles it is evident that no appreciable difference in time of survival can be observed corresponding to differences in acidity of the soil, although in so far as the figures are sufficient to indicate any difference, the difference is in favour of the more acid soils. A very striking difference in the soil nematode population of the different soils was observed, these becoming progressively more numerous in soil No. 1 until, on the last date of examination, an enormous number, certainly many thousands, were extracted. No progressive increase in soil nematodes was observed in the other samples.

It would appear, therefore, that the acidity likely to be present in ordinary agricultural soils, at least up to a hydrogen-ion concentration of 5.5, does not interfere with the survival of hookworm larvæ.

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A NOTE ON THE TOXIC SYMPTOMS OF ORGANIC ARSENIC.

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THE treatment of syphilis has of late years tended more and more to resolve itself into a course of intravenous injections of one or other of the numerous preparations of organic arsenic, combined with mercurial medication or not as the case may be. So general has the treatment become and so dramatic the early results that the public has come to regard the giving of an intravenous injection as being far simpler and more convenient than taking a dose of medicine, and the practitioner, having acquired a certain manipulative dexterity, approaches it in much the same spirit. The following three cases, occurring in a series of 3,098 injections of organic arsenic extending over three years, shew that the procedure is not unattended with a definite risk of alarming sequelæ. It is a risk, moreover, of which we have no warning, for in the present state of our knowledge there is no method of estimating the tolerance of any particular individual to the drug.

Case 1.—A Hindu female, aged 24, was admitted into the Voluntary Venereal Hospital on 22nd March, 1925, suffering from a very generalised secondary syphilide. The eruption was of a maculo-papular character and

extended all over the trunk and limbs, involving both flexor and extensor surfaces and the palmar aspects of both hands. Her general health was good and her nutrition fair. There was no lesion on the genitalia and the urine contained no albumen.

The blood was examined on admission by both the Wassermann and Sachs-Georgi tests and in both a strongly positive result was obtained.

Hospital records showed that she had been admitted two years previously in an advanced state of pregnancy, suffering from hard chancre and gonorrhœa. The Wassermann reaction was at that time also strongly positive. She however then refused to have any injections and was therefore treated with mercury, etc. She was delivered of a male child in hospital which survived with the loss of one eye from ophthalmia.

She had the first injection consisting of 0.3 gm. novarsenobillon on 31st March, 1925; this was followed in half an hour by a rise of temperature to 100°F. and by a rigor accompanied by headache and nausea. These symptoms however passed off within 24 hours.

The second injection was given on 7th April, 1925. The same dose was given and was followed as before by a rise of temperature to 101°F. and a rigor; all symptoms passing off within 48 hours as on the previous occasion.

The following morning, i.e., the third day after injection, she again complained of headache, nausea and anorexia. The tongue was moist but furred; pupils slightly dilated; the urine was scanty but contained no albumen, and there was no rise of temperature. Adrenalin was administered at once. By the evening however she had become semi-conscious, though responding to stimulus and exhibiting irritability. The pulse was full and compressible, the tongue coated, the pupils dilated and the neck slightly rigid. Four ounces of urine were drawn off by catheter.

By the following morning coma had deepened, the pulse was full and irregular, the extremities and neck were rigid, and the jaws clenched. Well-marked epileptiform convulsions occurred during the day, but there was still a response to painful stimuli. Coma however continued to increase in spite of repeated injections of adrenalin, and muscular rigidity became still more marked. At this stage venesection was performed without any relief, and the patient died during the night, about 100 hours after the second injection.

Case 2.—A Hindu female, aged 22, was admitted into hospital on 9th December, 1922, with a mixed infection, having a hard chancre of two weeks' duration with a profuse gonorrhœal discharge. There were no cutaneous lesions and the Wassermann reaction was strongly positive.

The first injection, consisting of 0.45 gm. novarsenobillon, was given on 25th December, 1922, and was followed by headache and vomiting, but there was no rise of temperature or rigor.

On 5th January, 1923, i.e., 11 days after injection, she was seized with epileptiform fits following one another without any return to consciousness and remained in the "status epilepticus" throughout the day, making no response to stimuli. There was rigidity of the neck muscles and difficulty in swallowing; the pupils were normal. The "status epilepticus" persisted for nearly 24 hours with muscular twitchings, and there was no response to painful stimuli. The urine was drawn off but contained no albumen. Repeated doses of adrenalin were administered and by the evening of 7th January, 1923, she showed signs of returning consciousness. Convulsions had ceased but the dejecta were still passed in the bed. The next morning she could talk and sensation had returned. Improvement slowly continued throughout the next three days but prostration was marked. One week after the injection she had sufficiently recovered for her relatives to remove her from hospital and all trace of her has since been lost.

Case 3.—A Hindu female, aged 24, was admitted into hospital suffering from primary syphilis on 4th October, 1920. She at first underwent a short course of

mercurial treatment but later expressed her willingness to have a course of injections and accordingly started on 21st October, 1920, with 0.45 gm. novarsenobillon, followed on 1st November, 1920 by 0.6 gm. and on 18th November, 1920 by 0.9 gm., making a total of 1.95 gm. Her local lesions had by this time completely disappeared and her general health much improved. On 8th December, 1920, i.e., 20 days after the last injection, she developed jaundice which rapidly increased, accompanied by fever. Her condition became steadily worse till 18th December, 1920, when she commenced to have epileptiform convulsions which passed on to the "status epilepticus" and died on 20th December, 1920.

The treatment employed in this case, as in the other cases, consisted mainly in the injection of adrenalin.

The similarity of symptoms in Cases 1 and 2 is sufficiently marked to suggest a common cause coming into action at varying periods in the two cases, while the variation of jaundice in the third case differentiates it from the other two.

The train of symptoms exhibited by Cases 1 and 2 are spoken of by McDonagh as pseudotoxic, appearing on the third day after injection and are otherwise described as "reactionary inflammation" or the "Jarish-Herxheimer reaction." In every such case, the patient has, or has had, generalised syphilis and such symptoms never occur in the primary stage. The cases fall into two main classes, intracranial and visceral; the cases quoted being of the former variety. The lesion appears to be a hæmorrhagic encephalitis and is assumed to be due to the battle going on between the colloidal protein particles and the active phases of the organism. The remedy intensifies the engagement in which the host assists by a dilatation of the capillaries of the area involved, in order that more protein particles may be brought into the field. The dilatation results in a raising of the intracranial pressure with the sequence that certain nerves are pressed upon and the patient becomes comatose and dies.

As in Case 1 a post-mortem was not allowed we are unable to confirm the presence of hæmorrhagic encephalitis, but in other respects it conforms to McDonagh's description.

In the second case symptoms came on on the 11th day after injection, a delay that is not easy to reconcile with the theory put forward by McDonagh.

Case 3, which came under the observation of one of us (S. C. D.), appears to have been one of true arsenical hepatitis, passing into acute yellow atrophy with the fatal result that always attends this condition. In this case the probabilities are that the disease had not become generalised, and therefore the jaundice was not of syphilitic origin but was primarily toxic. Unfortunately there is no record in the notes as to whether leucin and

tyrosin were present in the urine neither was a post-mortem obtainable. The case, however, so nearly corresponds with the clinical picture of acute yellow atrophy that we think we are justified in attributing the death to that cause.

The undoubted benefits of adrenalin in the treatment of these so-called nitritoid crises has been dealt with by Ehrlich who expressed the belief that untoward symptoms are due to a deficiency in the secretion of adrenalin. Brown and Pearce have shown that arsenic has a selective action on the adrenals and Hirano has shown that there is a marked deficiency in the epinephric content of the blood and the gland itself after an injection of organic arsenic even in therapeutic doses.

Millian considers that the symptoms are due to a serous exudate following a vasodilatation in the cerebral vessels, causing cerebral manifestations varying in severity from headache to convulsions. He also concludes that there must be some intimate connection between arsenobenzol and the suprarenals. Experiments have shown that after the administration there is a sudden consumption of adrenalin in the circulating blood, and the glands may be unable to make up the supply. The following facts support this theory of the cause of these nitritoid crises:—

1. The symptoms may be averted by the use of adrenalin.
2. The blood serum of animals injected with novarsenobenzol contains a smaller quantity of vasi-contractile substance than does normal serum.
3. The adrenalin content of the suprarenals diminishes after the administration of arsenobenzol.

Of the various theories put forward to account for the occurrence of these nitritoid crises, it seems that the adrenalin theory has a certain clinical support in the benefit derived from the administration of adrenalin. One of us (A. D. W.) recently saw a case of syphilitic myocarditis occurring in an untreated case six months after infection. A minimum dose of sulfarsenol was given subcutaneously and was followed in 24 hours by a typical nitritoid crisis manifested by very severe convulsions, coma and peristaltic inhibition. Adrenalin 1 in 1000 in 10 minim doses was given subcutaneously every 4 hours with almost immediate relief and ultimate recovery in a case that appeared almost hopeless.

Our reason for the publication of these cases is, firstly, to remind our fellow practitioners that there is this ever-present risk in the use of organic arsenic, and, secondly, to draw attention to the remedy available in the use of adrenalin.

STIBOSAN (VON HEYDEN "471").

By L. E. NAPIER, M.R.C.S., L.R.C.P.,

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I AM repeatedly receiving letters from practitioners asking various questions with regard to the use of Stibosan (von Heyden "471"). Although in most instances I have managed to find time to answer these letters I feel that the few details which are given below might save me much letter writing in the future.

Stibosan, the sodium salt of meta-chlor-para-acetyl-amino-phenyl stibinic acid, was first introduced for the treatment of kala-azar by me at the School of Tropical Medicine about two years ago and the first report was published in this journal in December 1923. Since then the compound has been used in a large number of cases and the good opinion that I formed of it has been confirmed by my subsequent experience.

A report of my total experience up to the end of March 1925 is in preparation and will be published shortly. Very favourable reports of its value in the treatment of kala-azar have also been made by other observers, including Sir Leonard Rogers (*Medical Annual*) and Lieutenant-Colonel E. D. W. Greig, I.M.S. (*Indian Journal of Medical Research*). It is only however during this year that the compound has been obtainable on the market.

It is now obtainable from most druggists in sealed ampoules containing either 0.2 or 0.3 grammes.

The Solution.—The required dose should be dissolved in sterile distilled water in order to make a 5 per cent. solution, i.e., 0.05 gramme will require 1 c.c., 0.1 gramme 2 c.c., 0.2 gramme 4 c.c., and 0.3 gramme 6 c.c. The solution should *not* be boiled and should be prepared freshly. (We have used solutions that have been kept 48 and even 72 hours without any ill-effects but as there is danger of the solution becoming contaminated, if kept, it is advisable to prepare the solution each day.)

DOSAGE.

Adults.—Comparatively strong adults can be given 0.2 gramme as the initial dose and 0.3 gramme subsequently. More debilitated ones can be given 0.15 gramme as the initial dose and 0.25 subsequently and very debilitated patients should be given 0.05 gramme as the initial dose, subsequent doses being increased cautiously.

Children.—Children tolerate the preparation in relatively larger doses. At the age of 3 years a maximum dose of 0.1 gramme, at the age of 9 0.2 gramme and from 12 years upwards a maximum dose of 0.25 will be well tolerated. The initial dose should be about half the maximum dose.

Intramuscular injections.—In children aged between 1 and 2 years I have given up to 0.1 gramme intramuscularly without causing more than slight local pain.

Total dosage.—A total of about 3 grammes of Stibosan for an adult weighing 100 lbs. is a little above the average "sterilising" dose. Cases that have previously shown any signs of resistance to treatment should be given a more prolonged course. Adults weighing less than 100 lbs. and children require proportionately less.

The routine course of injections will thus be from 11 to 15 injections. These should be given twice or three times weekly.

CONTRA-INDICATIONS.

There are few contra-indications to the use of Stibosan in kala-azar. There does not appear to be any danger in giving the compound to patients suffering from chest complications, as is the case with certain other antimony preparations. Neither a trace of albumen in the urine nor diarrhoea need be considered as signals to withhold treatment.

A certain percentage of cases of kala-azar under treatment with any form of antimony will develop jaundice; if this occurs it is as well to discontinue the injections for a short time until the jaundice shows signs of improvement, after this the treatment can be continued without danger of the jaundice relapsing.

In cases that show a certain amount of œdema of the feet, or develop this during treatment, the treatment can be given without any danger but my results have not been good with cases that have shown definite ascites. Thus definite ascites should be considered as a contra-indication.

SPECIAL ADVANTAGES.

In common with other pentavalent preparations of antimony (e.g., urea-stibanine) this compound makes it possible to effect a complete cure in about 12 injections instead of the 30 to 40 which were usually necessary with the antimony tartrates. The severe febrile reaction, the distressing coughing and the vomiting which are such common sequelæ of intravenous injection of the tartrate solutions are practically unknown when Stibosan is used.

This preparation has special advantages over the other pentavalent preparations in that it is a definite compound; it will therefore be of constant composition; and it is very stable. It does not undergo any change when in contact with the air. It is supplied in sealed ampoules but it is not essential that the compound should be used on the day the ampoule is opened. Thus, when a child is being treated, an ampoule of 0.2 gramme can be divided into three doses of 0.05, 0.05 and 0.1 grammes. An additional advantage is that when a large number of cases are being treated, as is the case in a hospital, 2 grammes, 3 grammes or whatever the amount required for the day can be weighed out (from

the 10 grammes bottles which are supplied for hospital use) and dissolved. The labour of opening each anipoule is thus avoided.

I have retained a portion of my first sample and quite recently I was able to show that it had neither undergone any chemical change nor increased in toxicity although it had been kept in an ill-corked bottle for 2 years at the ordinary Calcutta room temperature.

IZAL IN CHOLERA.

By LALBEHARY GANGULY,

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To test the efficacy of izal in the treatment of cholera it has been given a fairly extensive trial in the Cholera Ward of the Campbell Hospital from January to May 1925. As outbreaks vary in severity, to compare the effect of izal with that of our usual treatment with calomel, we put cases on izal or calomel, alternately, as they were admitted. Although the advocates of the izal treatment consider saline transfusions unnecessary, in view of the fact that practically all our cases were totally pulseless on admission, we did not consider it safe to withhold saline transfusions in any cases. If izal had any good effect it should manifest itself in a higher recovery rate even though cases received transfusions.

Izal was given on the lines recommended (Palmer 1924). Calomel was given in fractional doses until the stools changed colour. In both groups saline transfusions were given according to specific gravity indications of the blood. Calomel cases received alkalies with saline transfusions when necessary but izal cases did not (except by the mouth in some as noted below), this apparently being considered unnecessary with izal.

From January to May, 513 genuine cases of cholera were dealt with.

The mortality amongst calomel cases was 22.5 per cent.

The mortality amongst izal cases was 23.6 per cent.

The mortality is practically the same in the two cases but it should be noted that directly any one of the cases put on izal showed signs of impending uræmia, alkalies were started by the mouth and if there was no improvement within about twelve hours, izal was stopped altogether and alkalies pushed both intravenously and by the mouth. Thus in 23 cases it was considered imperatively necessary to stop izal and give alkalies. Taking these 23 as deaths, mortality in the izal group would stand at 35 per cent. much higher than in cases treated without izal. It is recognised that cresol bodies irritate the kidneys, and their administration in cholera would naturally be conducive to the onset of uræmia. It is a matter for some surprise that uræmia was

not more frequent in the izal group than was actually the case. This is probably because absorption from the gastro-intestinal tract is minimal in cholera.

Other complications of cholera, such as bronchopneumonia (this exacted a heavy toll), asthenia, parotitis, etc., were practically the same in each group.

The number and amount of saline transfusions were also practically the same.

Change in the character of the stools was somewhat earlier in the calomel group. Vomiting was the same in both. Vibrios were recovered from the stools with equal frequency in the two groups. It was not possible to investigate as to whether izal cases became vibrio-free earlier than calomel cases.

CONCLUSIONS.

(a) In the treatment of cholera, izal cannot be put on a higher level than any other drug so far tried.

(b) It is at a distinct disadvantage compared with others that have no irritant action on the kidneys. So far as any specific action is concerned, there is not much to choose between any of the drugs in common use *provided the drug exhibited has no irritant action on the kidneys.*

(c) Success, of the standard of an 80 per cent. recovery amongst pulseless cases, lies in judicious administration of salines and alkalies.

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LICHEN SPINULOSUS.

By GANAPATI PANJA, M.B.,

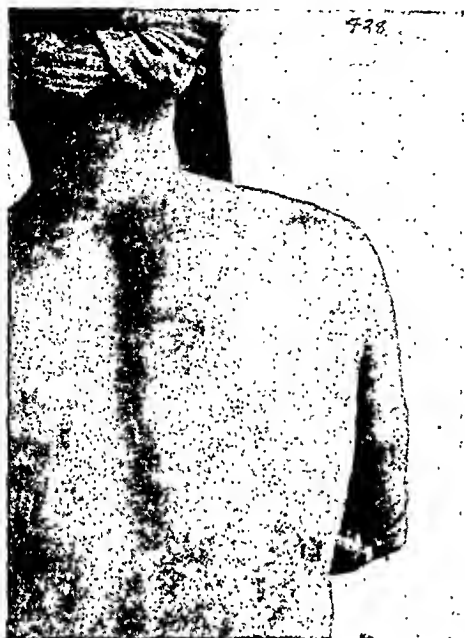
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We have come across four cases of this condition—one a young girl and the others male adults; two belonging to the better class and the rest to the lower class; one fair complexioned and the others dark.

The disease came on spontaneously but in the case of the first it appeared some time after typhoid. The general health of all was good. There were no septic foci in their teeth, throats, or elsewhere. There was no family history of the disease and no history of syphilis. The duration of the disease varied from three months to a year. No spontaneous cures and relapses were noticed.

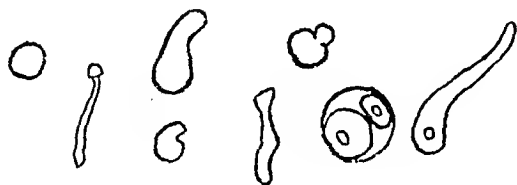
The disease is characterised by more or less symmetrically distributed groups or patches of sago-grain-like papules surmounted by filiform spines, arising from the hair follicles and situated most commonly on the abdomen and on the back of the shoulders near the axillæ. A distinctly rough feeling is experienced by passing the hand over the lesions. The appearance may

be compared to the characteristic arrangement of staphylococci under a microscope. No subjective symptoms are present.



Pathology.—A section of the lesion shows cellular hypertrophy around the hair follicles. No organisms could be detected. Most of the books on skin diseases state that the cause of the disease is at present unknown, but I have found fungi of the *tinca* group in scrapings from all the cases. The examination was made as follows:—

Horny plugs were scraped with a knife, treated with liquor potassæ (B.P.) on a slide and covered with a vaselined cover-glass. About 1 to 2 hours later the cover-glass is pressed a little so as to flatten the plugs and an examination is made with the 1/6th lens. The



*Fungi seen in scrapings from
L. spinulosus.*

accompanying diagram shows the appearance of the fungi. The keratin of stratum corneum swells up when treated with liquor potassæ and assumes a fungus-like appearance but this is quite different from the appearance of the true fungi.

Attempts have been made to grow this fungus, so far without success. We are waiting for further cases and if fungi are found in every case or at least in a large number of them, then,

the name *lichen spinulosus* may be omitted and replaced by *tinca spinulosus*.

The disease has to be distinguished from the following:—

- (1) *Lichen planus*.
- (2) *Keratosis pilaris*.
- (3) *Pityriasis rubra pilaris*.

Lichen planus is an irritable disease and the papules are flat, glistening and polygonal in shape.

In *keratosis pilaris* the lesions are usually present on the extensor aspects of arms and thighs and not grouped in patches.

Pityriasis rubra pilaris is an inflammatory disease and shows scaliness.

Treatment.—McLeod says that the affection is comparatively easily cured, but we hold just an opposite view. We have tried strong keratolytic remedies without rapid improvement. Vigorous scrubbing with soap, rectified spirit and hot water, and applications of tincture of iodine 4 drs., liq. hyd. perchlor. 1 dr., aqua ad. 1 oz. followed by ung. acidi salicylici 1 dr. to 1 oz. at night have been found the most successful. If iodine irritates, its application should be stopped. Painting single patches with diluted trichloroacetic acid may do good. Sometimes resorcin and benzoin lotion are useful. We have not tried the effects of x-rays on the disease.

FUNGO-SPIROCHÆTAL AFFECTIONS OF RESPIRATORY PASSAGES.

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K. N. ZUTSHI, M.B., B.S.,

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WHILE examining sputum of cases for T.B. at the Unao Hospital Laboratory, we have come across forms closely resembling the *Monilia tropicalis* of Castellani, together with spirochætes, pneumococci and *Micrococcus catarrhalis*. In a few there were staphylococci, streptococci and seldom fusiform bacilli.

The first case we saw in 1923 was a female of a well-to-do family and the appearance of *Monilia* reminded us of the articles published in the *Indian Medical Gazette* for November 1922 and April 1923, and so we began to examine the sputum of all suspected cases.

Up to this time we have come across 8 such cases (5 males and 3 females), and they can be classified into the following types:—

(1) Chronic cough with involvement of tonsils, sometimes with fever for two or three days and sometimes bloody sputum. Such cases were otherwise apparently healthy.

(2) Acute febrile bronchitis with bloody sputum supervening on sub-acute throat trouble. Acute condition disappearing rapidly after the use of the pot. iodide and

creosote mixture but *Monilia*, although decreased, were still to be found.

(3) Chronic bronchitis trouble with hectic or off-and-on fever, pain in the chest and back and sometimes bronchitic symptoms with abundant morning or evening sputum like boiled sago grains. Such cases were much run down in health.

(4) Chronic involvement of lungs, clinically of generalised tuberculosis showing apical consolidation, crackling and crepitant râles all over, much emaciation and fever, and large quantity of muco-purulent sputum.

Our first case was practically cured by autovaccine therapy and improved much in health except that there remained only a non-productive cough of throat origin. For more than a year now she has enjoyed apparently good health.

Another patient who agreed to have autovaccine treatment has been much relieved but is still under treatment. His treatment began in the beginning of this year.

The rest either did not agree to have the treatment suggested to them or having had little trouble except chronic tonsillitis and pharyngitis, were satisfied with the ordinary treatment. No patient up to the time of writing has been worse except one whom we expected to do badly as we saw him in a very advanced condition, classed in (4). He was asked to stay in hospital but he never returned from his village. Our experience is quite contrary to the cases described in the *Indian Medical Gazette*, where all the cases proved fatal.

MICROSCOPICAL APPEARANCES AND STAINING REACTIONS.

The fungus represents a thalamus with numerous hyphæ projecting from it and bunches of sporangia lying in the vicinity and between the *Monilia* threads.

Under 1-12th oil immersion lens, the hyphæ are medium chains about 40 μ long, but sometimes much longer. They show square-ended rods lying end to end, separated by a small interval. Each rod sometimes shows at either end a granule more darkly stained than the rest of the body.

Sometimes we find bunches of thinner and shorter *Monilia*, but we have never been able to see such forms projecting out of the thalami.

They stain well with ordinary dyes and are non acid-fast. The spirochætes show short and long, thick and thin, forms with tapering ends and the number of spirals varies from 2 to 8. They are stained well with dilute carbol-fuchsin.

Having no appliances for incubating and differentiating the various species of *Monilia* and spirochætes, we are handicapped in committing ourselves on such cases but that

they were thoroughly and repeatedly examined and watched all through the treatment. Hence, we can surmise that they were cases of fungus and spirochætal diseases of respiratory passages clinically.

A SUMMARY OF THE RESULTS OF AUTOPSIES HELD AT THE CALCUTTA POLICE MORGUE DURING 1923-1924 ON CASES OF SUDDEN DEATH.

By C. A. GODSON, M.C., M.R.C.S. (Eng.),
L.R.C.P. (Lond.),

MAJOR, I.M.S.,

Police Surgeon, Calcutta.

| | |
|------------------------------|-----|
| Post-MORTEMs held in 1923 .. | 288 |
| " " " " 1924 .. | 372 |
| " " " " Total number .. | 660 |

Causes of Death.

A. Accidental.

1. Injuries.

| | |
|---|-----|
| (a) Street accidents (motor cars, etc.) .. | 149 |
| (b) Other accidents (falls, railway accidents, etc., and gunshot wounds) .. | 74 |

2. Poisoning.

(no evidence of suicide obtainable) .. 58

| | |
|----------------------------|----|
| 3. Burns .. | 16 |
| 4. Drowning .. | 12 |
| 5. Overlaying of infant .. | 2 |
| 6. Suffocation .. | 1 |
| 7. Electric shock .. | 1 |
| 8. Sunstroke .. | 1 |

B. Homicide.

| | |
|-------------------------------------|----|
| 1. Stabs, wounds, etc. .. | 34 |
| 2. Gunshot wounds .. | 7 |
| 3. Criminal abortion .. | 3 |
| 4. Throttling .. | 3 |
| 5. Poisoning .. | 2 |
| 6. Burns .. | 1 |
| 7. Neglect and omission (infant) .. | 1 |

C. Suicide.

| | |
|--------------------------|----|
| 1. Poison .. | 45 |
| 2. Burns .. | 26 |
| 3. Hanging .. | 20 |
| 4. Gunshot wounds .. | 5 |
| 5. Cut throat .. | 3 |
| 6. Fall from a height .. | 1 |

D. Natural Causes.

| | |
|---|----|
| 1. Cardio-vascular sclerosis .. | 35 |
| 2. Infants (still-birth, prolonged labour, etc.) .. | 23 |
| 3. Pyrexial diseases (malaria, kala-azar, etc.) .. | 22 |
| 4. Pneumonia .. | 19 |
| 5. Cerebral apoplexy .. | 16 |
| 6. Pulmonary phthisis .. | 13 |
| 7. Dysentery, gastro-enteritis .. | 9 |
| 8. Uræmia .. | 8 |
| 9. Rupture of aneurysm .. | 8 |
| 10. Heart disease .. | 5 |

| | |
|--|----|
| 11. Peritonitis. (perforation of ulcer, appendicitis) | 5 |
| 12. Anæmia | 5 |
| 13. Intestinal hæmorrhage | 4 |
| 14. Meningitis | 3 |
| 15. Chronic bronchitis | 2 |
| 16. Cerebral abscess | 2 |
| 17. Cerebral tumour | 1 |
| 18. Abscess of liver | 1 |
| 19. Unknown owing to advanced decomposition or perhaps some poison | 11 |

Statement of Poisons Responsible for Death.

| Poison. | Accidental. | Suicide. | Homicide. | Males. | Females. | Child. |
|---------------------------|-------------|----------|-----------|--------|----------|--------|
| Opium | 39 | 15 | 1 | 8 | 7 | 1 |
| Arsenic | 1 | 7 | 1 | 3 | 5 | .. |
| Nitric acid | 1 | 5 | .. | 4 | 2 | .. |
| Alcohol | 5 | .. | .. | .. | .. | .. |
| Hydrocyanic acid | .. | 5 | .. | 5 | .. | .. |
| Carbon monoxide gas | 5 | .. | .. | .. | .. | .. |
| Morphia | .. | 4 | .. | 3 | 1 | .. |
| Carbolic acid | .. | 3 | .. | 2 | 1 | .. |
| Sulphuric acid | .. | 2 | .. | .. | 2 | .. |
| Cocaine | 2 | .. | .. | .. | .. | .. |
| Strychnine | .. | 2 | .. | 1 | 1 | .. |
| Aconite | 1 | .. | .. | .. | .. | .. |
| Atropine | 1 | .. | .. | .. | .. | .. |
| Phosphorus | .. | 1 | .. | 1 | .. | .. |
| Oleander | .. | 1 | .. | .. | 1 | .. |
| Cannabis indica | .. | 1 | .. | 1 | .. | .. |
| Nux Vomica | 1 | .. | .. | .. | .. | .. |
| Datura | 1 | .. | .. | .. | .. | .. |

NOTES.

In cases of poisoning there is usually not much information to be obtained and it is difficult to classify poisoning as to whether accidental or suicidal.

Suicide by burning is comparatively common in Hindu females; out of 26 such cases, 24 were Hindu females, 1 an Indian Christian, and 1 a Hindu male.

Suicide by hanging. Out of 20 such cases, 9 were Hindu females, 8 Hindu males, and 3 Mahomedan males. These were the only 3 cases of suicide amongst Mahomedans.

Suicide by gunshot wounds. Three were European males and 2 were Hindu males, one of these was a sepoy who running amok and shooting a havildar, finally shot himself.

Opium is the commonest poison to be used for suicide and probably many of the cases classified as accidental, due to an overdose, were in reality cases of suicide.

One case of carbon monoxide gas poisoning is interesting in that there were 3 persons in the room that night, father, mother and child; of these the mother died, the father was unconscious, and the child apparently was unaffected.

A case of poisoning by liquid extract of nuxvomica, which was accidentally dispensed in mistake for liquid extract of ergot, occurred in a European female. The dose said to have been given was 30 minims which contains about 2½ths of a grain of strychnine, i.e., less than ½ gr., the known fatal poisonous dose; but of nuxvomica itself the smallest known fatal dose is 30 grs. of the powder, equivalent to 1½ gr. of strychnine only, so that probably 30 minims of the liquid extract may be a fatal dose.

A Mirror of Hospital Practice.

A CASE OF ECHIS CARINATUS (?) POISONING.

FAILURE OF CALCIUM AS A THERAPEUTIC AGENT. DEATH IN 86½ HOURS.

By F. WALL, C.M.G., K.H.S.,
COLONEL, I.M.S. (RETD.),
Maymyo, Burma.

THE following interesting case of ophitoxæmia occurred in Karachi when I was Assistant Director of Medical Services in that district. The case came under the care of Major Newton Davis, I.M.S., to whom I am indebted for these notes.

I append an abridged version of the notes on the case sheet.

History.—Babu Kale, a sepoy in the 2½th Mahratta Light Infantry, aged 23, reported sick at 8 A.M. on the 18th of August, 1923, at the Indian Station Hospital, Karachi. He had a swollen foot which he said was due to a fall. He was selected for x-ray examination and admitted into hospital. At 9-30 A.M. he confessed that he was bitten by a snake at about 5 A.M. whilst going to the latrine and did not report this at first on account of fear. The snake had not been killed and had escaped.

Present condition.—Examination revealed two tiny punctures on the dorsum of the left foot which was very swollen. The patient complained of severe burning pain in the foot and faintness. His pulse was fairly good and respiration normal.

A tourniquet was applied, the punctures incised and potassium permanganate crystals were rubbed in. Antivenene, 40 c.c., was administered intravenously.

At 2-30 P.M. the patient was very restless. He was bleeding freely from the gums and expectorating blood. The dressings on the foot had been changed three times since the morning owing to soakage of blood. Pulse, very feeble. 15 minims of adrenalin hydrochloride, followed by 30 c.c. of antivenene, were injected subcutaneously.

At 7 P.M. his pulse was still very feeble and bleeding continued. 1½60th grain of strychnine was injected subcutaneously.

At 7-30 P.M. there was no improvement. A 1 c.c. ampoule of pituitrin, followed by 15 minims of adrenalin chloride, was injected as well as $1\frac{1}{2}$ grs. of calcium lactate in 5 c.c. of saline solution intramuscularly.

At 11 P.M. he was in the same state. A second dose of pituitrin was injected.

At 5 A.M. on 19th August, 1923, the patient was in the same state. 1 c.c. of pituitrin and 15 minims of adrenalin were injected.

At 9-30 A.M. he was very restless, tossing about in bed and exclaiming that he was going to die. He passed a stool which was free from blood. His pulse was very feeble and couldn't be counted. The dressings on his foot were changed hourly owing to the copious oozing of blood. Respiration was hurried and short and the muscles of his face and hands were twitching. The foot of the bed was raised and an injection of $1\frac{1}{2}$ grs. of calcium lactate with 5 c.c. of sterile water was given intramuscularly.

At 10 A.M. he continued to spit blood. He was drowsy, apparently unconscious fitfully, his pulse was failing, and his extremities were cold. Hot water-bottles were applied and a sinapism over the heart. 2 c.c. of hæmstatic serum (Parke, Davis & Co.) with 5 c.c. of saline was given intramuscularly.

At 12-15 P.M. the dressings were again soaked through.

At 9-10 P.M. he was very restless and his pulse was imperceptible, but the bleeding from the gums had ceased. $1\frac{1}{2}$ grs. of calcium lactate in 5 c.c. distilled water was given intramuscularly.

At 8-45 A.M. on 20th August, 1923, the patient's condition was very bad. He had had a sleepless night, his pulse was very feeble, respiration shallow, and he was unconscious. $1\frac{1}{2}$ grs. calcium lactate was given intramuscularly.

At 10 A.M. deep sutures and tincture benzoin co. were applied to his foot,—after which the local bleeding temporarily subsided.

At 12 noon bleeding was as bad as ever; the dressings were soaked and had been changed twice since 10 A.M. The blood was now yellowish in colour and his extremities were cold. Hot water-bottles were applied.

At 6 P.M. his condition was desperate; unconscious; pulse imperceptible; and respiration very hurried. $1\frac{1}{2}$ grs. of calcium lactate was injected.

At 8 A.M. on 21st August, 1923, the patient's condition was the same as the night before, i.e., tossing in bed, face and hands twitching, retching and grinding his teeth. $1\frac{1}{2}$ grs. of calcium lactate with $\frac{1}{4}$ gr. of morphia was injected.

At 4 P.M. he was still unconscious; pulse was imperceptible; breathing stertorous; and bleeding continued. Adrenalin with pituitrin and strychnine was injected.

At 4-30 P.M. the dressings were again changed. $1\frac{1}{2}$ grs. of calcium lactate were injected and 1 pint of normal saline was given per rectum.

At 6-30 P.M. there was no improvement. $\frac{1}{4}$ gr. of morphia was injected.

At 7 P.M. there was still no change. Pituitrin and adrenalin were injected and the patient died at 7-45 P.M.

Autopsy.—The autopsy disclosed nothing of special interest beyond the escape of about 4 ounces of thin blood from the subarachnoid space when opened—which did not clot subsequently—and a general pallor of all the organs.

Remarks.—There is little reason to doubt that the snake responsible for this fatality was the saw-scaled viper "*Echis carinatus*" or the "kupper" of Sindis. The symptoms were typically those of a viperine toxæmia. Russell's viper—the only other viper occurring in Sind—is not likely to be found in Karachi, though it occurs sparingly outside the town. *Echis* is a common snake all over Sind, and occurs frequently within the precincts of Karachi.

I saw the case on the evening of the 18th of August. Blood collected so rapidly in the patient's mouth that he had to use his spitting mug two or three times a minute. I advocated calcium subcutaneously, and $10\frac{1}{2}$ grs. of the lactate were injected in 72 hours without controlling or abating the profuse hæmorrhage.

Three questions arise out of this case:—

- (1) Once the blood has been decalcified by an agent like snake venom is it possible to restore its calcium content by introducing calcium into the system or direct into the blood stream?
- (2) If No. 1 is possible, what dose of calcium is necessary to achieve this purpose?
- (3) If No. 1 is possible, within what limits of time is it possible to restore the calcium content?

With regard to question (2), one has to be on one's guard in injecting calcium into the blood stream, as in some cases extensive thrombosis has resulted. As far as I know this has only occurred in cases where the blood has been normal. It is probable that a dose which might occasion thrombosis in a normal condition of blood would have little or no danger in the abnormal state of the blood in a case of ophitoxæmia. All these questions could be solved by laboratory experiments. We ought to know whether calcium is of any use in snake poisoning, and if so, its best channel of introduction and the largest dose that can be administered with safety.

A FATAL CASE OF SNAKE-BITE (? *ECHIS CARINATUS*) DURING PREGNANCY.

By S. A. S. CHUHAR SINGH, I.M.D.,

In-Charge Civil Dispensary, Hurnai, Baluchistan.

On 20th July, 1925, at about 8-30 P.M. a Mohamedan woman, aged about 30 years, was bitten just above the left malleolus by a snake which she described as a 'Landai' (the local name for *Echis carinatus*).

Tobacco leaves were applied, locally, and something was tied round the leg, but was

taken off very soon owing to the discomfort she complained of. She was brought to the hospital (Hurnai) on a donkey at 7-30 A.M. on 21st July 1925.

Briefly, the signs and symptoms were:—

1. Local swelling.
2. Local and general (head, abdomen and back) pain.
3. Bleeding (local, subconjunctival, from the mouth, genital and urinary passages).
4. Increasing weakness.
5. Drowsiness.

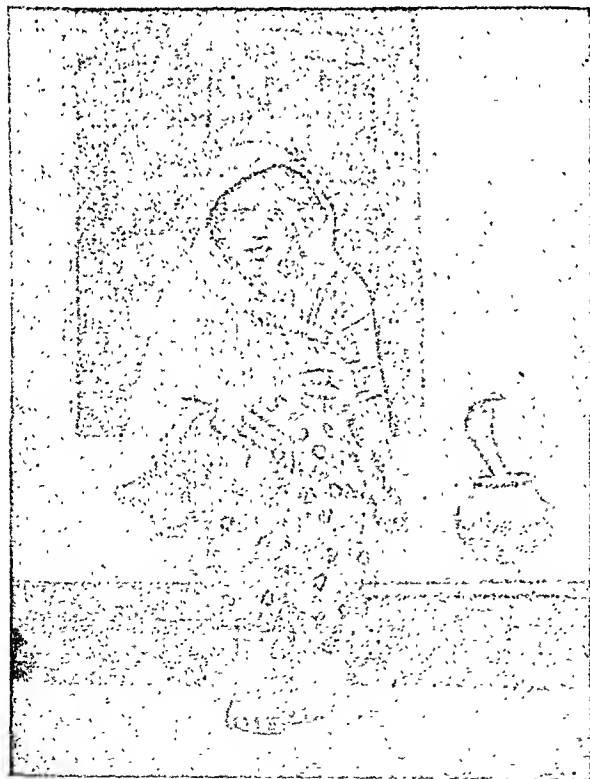
On admission she stated that she was five months pregnant. On the morning of 23rd July, 1925, pains started and at midnight a dead female foetus was born. The mother died at 4 P.M. on 24th July, 1925.

A CASE OF COBRA BITE SUCCESSFULLY TREATED WITH FITZ-SIMSON'S POLYVALENT ANTI-VENOMOUS SERUM.

By A. C. BHARADWAJ, L.M.P., P.S.M.S.

House Surgeon, King Edward VII Hospital, Benares.

SARUPIA, a female patient, aged 25 years, was bitten by a cobra in the web between the left index finger and thumb at 12 A.M. on 5th August 1925. There were two punctured marks at the bitten spot. She was brought to hospital at 6 P.M. on the same day; during



The patient and the cobra with its fangs taken out.

the interval she was being administered nostrums by a *Madari* who had caught the cobra (shown in the photograph). They had

applied two ligatures one above the wrist and the other below the elbow joint. She was brought to hospital in a state of collapse and complete unconsciousness. The pulse at the wrists was quite imperceptible, temperature 95.5°F., perspiration pouring out, corneal reflex absent, extremities cold and clammy, the face cyanosed and breathing was hurried and stertorous.

There was paralysis of muscles of the tongue and face, resulting in the drooping of the eyelids and the lips. Saliva was dribbling down the chin. The left arm and forearm were very much swollen and blisters were forming all over them. The patient was at once given an injection of strychnine, the wound cleaned with Condy's lotion and 6 grains potassium permanganate was rubbed into the wound after it had been freely incised by an X-shaped incision. Then an intravenous injection of 10 c.c. of Fitz-Simson's polyvalent anti-venomous serum was given and the patient put to bed with hot water bottles applied to her feet. The ligatures were soon after removed.

At 9 P.M. the condition of the patient was considerably improved; the pulse had returned, the limbs were warm and the breathing was a little easier. Though the patient was conscious and could open her eyes she was unable to see anything. She could utter some words but the paralysis of the pharyngeal muscles (which could not be detected at the time of admission) was still complete and the patient was unable to swallow water.

Another intravenous injection of 10 c.c. of the serum and a subcutaneous injection of strychnine was given at this stage and two hours later the patient was chatting and sitting up in bed as if she had never been ill. At 11 P.M. she also passed urine in large quantity which she had not done since 12 A.M.

The patient was discharged completely cured on 7th August 1925.

The case is remarkable for its complete and quick recovery.

The polyvalent serum was injected as late as six hours after the poison had totally permeated the system, still it acted like magic.

Although in this case the snake had been caught and was known to be a cobra, it is claimed by the manufacturers that the serum being polyvalent is equally effective against any variety of snake venom. In view of the fact that over twenty thousand people die of snake bite in India every year, this treatment should prove very useful if it gives such good results as in this case.

I am very grateful to Lt.-Colonel J. S. O'Neill, M.C., M.D., F.R.C.S. (Edin.), I.M.S., the Civil Surgeon for kindly allowing me to publish these notes.

A CASE OF LARGE OVARIAN CYST NOT OBSTRUCTING DELIVERY OF A CHILD.

By B. SANJIVA RAO, L.M. & S.

DR. B. SANJIVA RAO, L.M. & S., writing from Masulipatam, Kistna District, reports a case of large ovarian cyst which appears to have developed during the course of pregnancy and which did not interfere with labour. A bucket and a half of fluid was drawn off at the operation which took place about a month after delivery of a healthy child.

Recovery from the operation was uneventful.

(Abstract from original communication).

INTERESTING EFFECT OF AN INSECT BITE.

By P. S. MILLS, M.B.,

MAJOR, I.M.S.,

Civil Surgeon, Gaya.

A MOHAMEDAN boy, aged about 11 years, was admitted into the Pilgrim Hospital, Gaya on 5th April, 1925, complaining of pain on micturition, and priapism.

The history was that about five days previously he had been bitten on the left foot by an insect that is called in the vernacular a *chharbinda*, and which is, as far as I can ascertain, a variety of dung-beetle.

Immediately after the bite he felt burning pain throughout the limb, and shortly after there was erection of the penis. The pain in the limb subsided in a few hours, but the painful erection persisted, and he sought relief for this condition.

On admission the boy was considerably distressed, and the penis was erect and so hard as to feel like cartilage. It was arched somewhat forwards and very tender. There was pain and difficulty on micturition, but no retention of urine.

He was treated with laxatives and opiates and the condition persisted for about five days after admission into hospital, and he was discharged well on the seventh day. There was no pyrexia, and nothing abnormal in the urine.

A CASE OF ARSENICAL INTOLERANCE?

By Y. S. ROW, L.M.D.,

Alipuram Jail Hospital, Bellary.

A MALE patient, aged about 35 years, came under my observation on 20th June, 1923, suffering from ulceration of the right cornea at its lower part following on an acute attack of interstitial keratitis. As he gave a positive history of syphilis some years back and as the same disease is one of the causes of the above condition, I decided to give the patient a course of neosalvarsan intravenously. The first injection of 0.3 grm. was given intravenously on 23rd June, 1923. He did not show any reaction

on that day. On the second day after the injection the patient developed an urticarial rash all over his body, more on its front aspect. There was no itching anywhere. On the third day of the injection, his evening temperature rose to 104°F. and kept up at that high level for four subsequent days without any remission whatever either in the mornings or in the evenings. He had none of the gastro-intestinal symptoms such as vomiting or diarrhoea. Except for the high temperature and rash, the patient did not complain of anything, nor was he much visibly affected by the above two symptoms. His lungs were carefully examined, no signs of pneumonia nor of any disease could be made out. The pulse and respiration ratio was normal. No cough at all.

On 30th June, 1923, the patient's temperature came down to normal by crisis and his rash disappeared on the following day. Since then he has made an uneventful recovery.

I did not continue the injection afterwards for fear of repetition of the above symptoms.

Remarks.—I can understand the cause of the urticarial rash which sometimes occurs in persons who have got an idiosyncrasy to arsenic, but what I cannot understand is the cause of the fever. Since the fever appeared on the third day after the injection I thought that it might be a mild septicemia due to the infection through the needle of the syringe, though I myself very carefully sterilised the syringe as well as the distilled water. Or was the temperature due to any impurity in the preparation of '914' used by me? I have come across many cases of accidents with the same drug, of which there were many spurious imitations on the market in those days.

I do not think that the fever was due to the arsenic in '914' as then the temperature would have gone up the same evening after the injection instead of on the third day.

A CASE OF ARSENICAL INTOLERANCE.

By V. N. DEUSKAR, L.C.P. & S., L.M.D.

Haddo, Port Blair.

As there appears to be no doubt that *sulfarsenal* is the least toxic of all the arsenical preparations available to-day, and because cases of the toxicity of this drug have not so far appeared in the *Indian Medical Gazette* the following case, I think, would appear to be of special interest.

S. K. P., a clerk, aged 22, came under my treatment at Ahmedabad on 5th December, 1924, with all the signs of a fully developed secondary syphilis including marked cachexia which had totally disabled him to either stand up or walk about. The temperature chart which the patient had so carefully maintained from May to December 1924, was remarkably interesting. The "long continued fever" of nearly seven months' duration without one single day of apyrexia made up the most typical hectic chart of the text-books. Being too long it is unsuitable to be appended

here. Up to the date of my seeing him, the patient had not received any arsenical treatment, and even apart from the other signs and symptoms, the temperature chart alone was enough proof of the progress of an untreated case of syphilis. He was treated as follows:—

6th December, 1924.—Weight 91 lbs. 0.3 gramme of N. A. B. was given intravenously. The Jarish-Herxheimer reaction was nil. There was no "flare-up"; on the contrary this was the first day his evening temperature was normal although subsequently the patient was running a temperature as usual up to 23rd December, 1924. The dose was tolerated perfectly well.

13th December, 1924.—Weight 94½ lbs. 0.45 gm. of "914" was given intravenously. Immediately the patient burst out into a sharp, sudden paroxysm of short, suppressed coughing; at the same time there was itching all over the body and within less than three minutes the patient developed a profuse urticarial rash. The rash was well raised above the surface of the skin, intensely hyperæmic and of scarlet hue, the hyperæmia fading on pressure but reappearing instantaneously. 5 c.c. of intramine was at once injected intramuscularly and 1 c.c. of 1 in 1000 solution of adrenalin. The rash disappeared within half an hour but the cough was distressing and continued for five days more. There was also a general "flare up" after the injection; and the patient lost 5 lbs. in weight during the following week.

The treatment was suspended and the patient was put on to 8 grs. pot. iodide t.d.s. from 16th December, 1924. The fact that pyrexia of syphilitic origin is often only amenable to iodides was very striking in this particular case as from 23rd December, 1924, i.e., with a week's iodide, the disease was rendered permanently apyrexial.

When the weight of the patient was again 91 lbs., on 3rd January, 1925, subcutaneous injections of sulfarsenol were substituted as follows:—

4-1-25.—6 cgms.

6-1-25.—12 cgms.

8-1-25.—18 cgms.

10-1-25.—24 cgms.

There was no immediate reaction of any sort. The drug was tolerated as well as any other ordinary hypodermic injection. On the afternoon of 11th January, 1925, however, the patient complained of intestinal colic and began to vomit; not even a tablespoonful of iced water could be retained. Vomiting was persistent, lasted for 24 hours and required an injection of morphia.

There were no other signs of intolerance except this; the temperature was normal, the weight was not lost and there was no giddiness, headache or diarrhoea. The drug was withheld.

By 16th January, 1925, the weight of the patient increased to 94½ lbs. and treatment resumed as under:—

17-1-25.—30 cgms.

20-1-25.—36 cgms.

There was no immediate reaction either local or general but on 21st January, 1925, the same symptoms as on 11th January, 1925, recurred, and hiccup was an additional feature this time. Colic was now less complained of but the vomiting was much worse—the patient vomiting every 10 or 15 minutes. This, together with the hiccup, lasted 48 hours and required two injections of morphia; there was also much borborygmi. The drug was consequently again withheld. During the latter part of January the patient had gained good strength, was easily able to walk two miles and looked quite fit. Treatment was continued thus:—

5-2-25.—42 cgms. There was no local eruption or any general reaction.

11-2-25.—48 cgms.

Here the patient immediately developed exactly the same pulmonary and skin symptoms of arsenical intolerance as after 0.45 gm. of "914." In this case too the rash appeared within less than 3 minutes of giving the injection. This is an interesting feature inasmuch as it explains *how quickly sulfarsenol gets absorbed and reaches the general circulation after a subcutaneous injection.*

At this time neither intramine nor adrenalin was given but the patient was carefully watched. Both the rash and the cough disappeared after half an hour and the patient was up and about as usual and attended his duties.

It may be added that the bowels of the patient were opened before each injection and the urine was carefully examined and found normal each time. As would appear from the above the course of sulfarsenol was very cautiously proceeded with but the patient's intolerance for arsenic was very great and the nature of some of the symptoms he developed, far from usual.

A CASE OF OVARIOTOMY.

By RAI SAHIB CHHAGAN NATH,

Chief Medical Officer, Durgapur State, Rajputana.

A HINDU woman, aged 42, a multipara, came to Bijaya Hospital, Durgapur and stated that she was suffering from a growth in her abdomen for 23 years. She added that at first this growth had appeared on the left side and since then has continued to fill the abdominal cavity gradually. She has been a woman of thin constitution but has been in fairly good health.

Operation.—An incision in the median line 4 in. long below the umbilicus was made dividing the skin and fat. The sheath of the rectus muscles was opened and the recti were separated. After that an incision was made in the peritoneum and as soon as the peritoneal cavity was entered, the tumour was surveyed by hand all over its surface. A few adhesions were discovered but they being soft, readily broke down under the hand. The next step taken was to tap the cyst by plunging in a Spencer-Wells trocar and cannula. Tapping brought out with

some difficulty $7\frac{1}{2}$ lbs. of dark-brown fluid, without reducing markedly the size of the cyst. This naturally made me think that it should contain some solid matter. Accordingly the opening in the cyst was enlarged and the hand passed inside it, when greasy sebaceous matter was felt. This was scooped out by means of my hand and was found to weigh 15 lbs. of sebaceous material besides 12 ozs. of hair. When the cyst got thus emptied it was drawn forward and was discovered to be adherent to the omentum. The latter was ligated and divided. The pedicle was then securely tied off and also divided. The abdominal wound was closed in the usual way. The interior of the cyst was found to have been lined with hairs while the layers of its walls had embedded betwixt them growths of tiny bones here and there. The total weight of the cyst is tabulated as under:—

| | | |
|------------------------|----|---------------------|
| (1) Fluid matter | .. | $7\frac{1}{2}$ lbs. |
| (2) Sebaceous material | .. | 15 lbs. |
| (3) Hairs | .. | 12 ozs. |
| (4) Sac | .. | 1 lb. |
| Total weight | | 24 lbs. 4 ozs. |

The wound healed by first intention and the patient making an uneventful recovery left the hospital four weeks after the operation.

Photo. I.



Before operation.

The two photographs of the patient both before and after the operation vividly show her condition. In the after operation picture the tumour is shown hanging beside the patient.

Photo. II.



After operation.

A CASE OF GENERALISED BLASTOMYCOSIS.

By GANAPATI PANJĀ, M.B.,

Assistant Professor of Bacteriology, Calcutta School of Tropical Medicine and Hygiene.

DIHANARATIA, a low-class Hindu female, aged about 8 years, inhabitant of Azamgarh, U. P., came with ringed lesions on the face, upper arms, legs and back.



The duration of the disease is five months and, as the patient's mother says, it started on the face, arm and leg simultaneously. There is no family history and no one in the patient's village is said to suffer from such a disease.

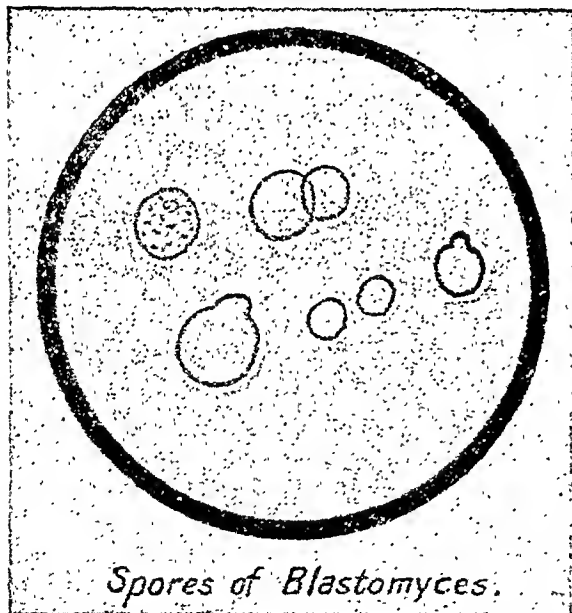
The disease was characterised by more or less circular patches, raised above the skin surface, healing in the centre and leaving scars; the margins showing papules, and nodules and pustules covered with scabs. Subjective symptoms were absent. There were no signs of congenital syphilis.

The disease was evidently a granuloma, but it might have been either syphilis, yaws, tuberculosis, tinea or blastomycosis.

Pathological Examination.—Scrapings were made from the margins and scales examined. A few spores of fungi were found. Examination was made for spirochætes by Dr. B. M. Das Gupta and none were seen.

The Wassermann reaction, which was kindly carried out for me by the assistant to the Imperial Serologist, was strongly positive.

A bead of pus from a pustule was examined by me with liquor potassæ and typical yeast-like organisms of blastomycetic dermatitis were found.



Treatment.—Mist. pot. iodide containing grs. $2\frac{1}{2}$ of iodide and locally ung. hydrag. am. dil. were given and the patient has shown a considerable improvement in two weeks' time. One week more will probably be needed for complete recovery.

Cases of blastomycetic dermatitis—localised and generalised—are often seen at the skin department of the Calcutta School of Tropical Medicine.

The diagnostic points are as follows:—

(1) Patchy lesion, pinkish, showing healing and scars in the centre and margins with

interrupted warty projections and pustules.

(2) Presence of typical fungi in the pustules when examination is made with liquor potassæ.

(3) Disappearance of the lesions with pot. iodide, X-ray and ung. hydrag. am. dil. or Lassar's paste.

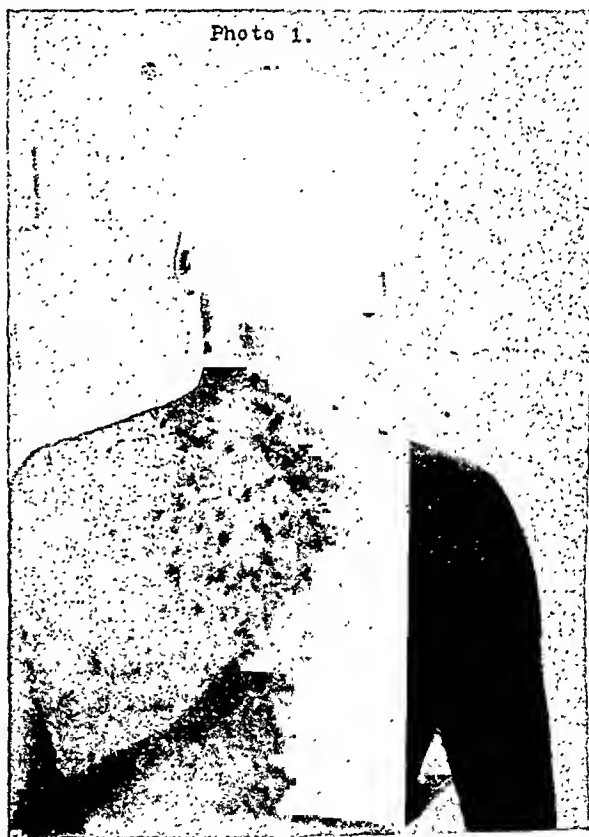
A CASE OF MELANODERMA.

By GANAPATI PANJA, M.B.,
Asst. Professor of Bacteriology, Calcutta School of
Tropical Medicine and Hygiene.

K.D.P., Hindu male, aged 19, fair-complexioned, belonging to the Subarnabanik caste, of good health, came to me with blackish patches almost all over his body.

The patches were small, (vide photo 1) roundish, more black than brown, slightly

Photo. I.



rough and most marked on the trunk. There was no irritation,

The patient was ill for 5 years and the disease started on the front of his neck spontaneously. The mucous membranes and the tongue are free from pigmentation. There is no family history and the Wassermann reaction was negative.

As the patches were rough and slightly raised above the skin surface, a microscopical examination was made of the scrapings from them and a very large number of yeast-like organisms, the so-called spores of Malassez,

were found, as shown in photo 2. A control was also made by examining scrapings from the unaffected skin in between the patches and a few organisms were found.

Photo. II.



It is possible that the condition of hyperpigmentation or melanoderma is due to the above spores producing a slow and mild irritation of the melanoblasts. It is also possible that there is some disorder of internal secretions as well, as the patches were discrete and rarely diffuse. Bottle bacilli or spores of *Malassezia* usually give rise to diffuse pigmentation.

Treatment.—Sulphur soap to wash with, bismuth and hydrag. perchlor. lotion to apply in the day time, and salicylic and resorcin. ointment to apply at night. I am touching a few spots with diluted trichloroacetic acid to produce desquamation and rapid cure. The patient is doing well.

A FATAL CASE OF SNAKE-BITE (? *ECHIS CARINATUS*).

Reported by Jemadar CHUHAR SINGH, I.D.S.M.,
I.M.D.,
Sub-Assistant Surgeon, Civil Dispensary, Hurnai.

About 5-30 A.M. on June 30th, 1925, a Mahomedan woman, aged about 30, was bitten on the left ankle by a snake which was described by her as a "landai" (the local name for the

Echis carinatus). Her husband brought her to the Hurnai Civil Dispensary at about 7-30 A.M. (He had tied his turban round her leg, but had taken it off again as she said she couldn't walk with it in place). On examination there were two punctures at the level of the left external malleolus, one of them very faint. They were incised, potassium permanganate rubbed in, and a bandage applied. The patient complained of pain in the left leg, side and shoulder, and head, and the foot was swollen.

At 8-30 A.M. 10 c.c. of calcium chloride grs. iv. in distilled water was injected into the neighbourhood of the bite. Half an hour later she said she felt stronger and that the pain was less.

9 A.M. Haemorrhage from the mouth.

11 A.M. Severe haemorrhage from the mouth; gums bleeding; marked oedema to the knee.

11-30 A.M. Calcium chloride injected.

4 P.M. Pain and haemorrhage continued. Condition fair.

8 P.M. Very severe pain in the foot and slight pain in head and shoulder. Pulse good.

At 2 A.M. on 1st July, 1925, the patient was still bleeding from the mouth and copiously from the bite; the whole leg being soaked. The wound was cleaned and dressed. As an injection of calcium chloride was refused, grs. xxx was given by the mouth and repeated twice later in the day. Her general condition was still fair.

12 Noon. Restless; severe pain in leg, back and head. Pulse and breathing slow. Bleeding continued. Banerji's inhalation tried.

12-30 P.M. She said she felt much better. Inhalation given repeatedly.

4 P.M. Still bleeding, but general condition fair.

8 P.M. She took some milk and rice. Complained of pain. Inhalation repeated.

At 6 A.M. on 2nd July, 1925, the patient had severe pains in the back, abdomen and head. Bleeding from the mouth had stopped but that from the wound still continued. She had vomited several times during the night.

12 Noon. No Change.

4 P.M. Drowsy; had severe pains in the head and back; leg very swollen, tender and hot; temperature 100° F., pulse 60. No relief after inhalation.

5 P.M. 1 pint of hypertonic saline given intravenously, after which she felt better. Pulse 80 and fairly strong.

9-30 P.M. Pain again very severe; had vomited twice. Drowsy; answers very slowly. Pulse 60; breathing slow; condition bad. $\frac{1}{2}$ oz. of brandy every four hours ordered. Failed to get needle into vein for hypertonic saline injection. Spirit. Ammon. Aromat., 1 drachm every two hours, ordered.

On 3rd July, 1925, the patient's condition was the same. Bleeding from the wound was less, but her husband stated that she had been bleeding from the vagina since the previous day.

9-30 A.M. Severe pain; sleepy; condition bad.

10 A.M. Succeeded in getting needle into vein and gave 15 ozs. of hypertonic saline before needle slipped out. No improvement; sinking slowly.

11-30 A.M. Adrenalin given hypodermically.

2-30 P.M. As before. Flatus giving trouble; unable to urinate but passage of catheter not allowed.

3-30 P.M. Feet and hands cold; pulse imperceptible; breathing very slow; drowsy; no paralysis.

4 P.M. Unconscious.

5 P.M. Died.

NOTES.

1. The œdema of the leg was greater than I have ever seen previously in a case of snake-bite.

2. Her husband stated that she was in the habit of catching snakes and that she had been bitten twice previously by "black snakes" without ill effects.

A CASE OF VOLVULUS OF THE ILEUM.

By M. E. TIRU CHELVAM, L.M.S.,

Assistant Surgeon, District Hospital, Ipoh, F. M. S.

A MALE Sikh, aged 30, was admitted into the District Hospital, Ipoh on 10th April, 1925, at 8 A.M. with a history of eight hours' illness. He complained of colicky pain about the umbilical region. There was no history of fever or vomiting. Temperature on admission was normal and pulse 82 and of good volume. He had not passed any motion for twenty-four hours. Examination of hernial orifices revealed a right reducible inguinal hernia. A simple enema was given and returned without any appreciable result.

In the afternoon the pain was generalised and the abdomen slightly tender. There was as yet neither vomiting, rigidity nor tympanitis. The pulse was good and the temperature 99.8°F. Two high olive oil enemata were given with poor result.

The patient was watched, and early next morning the abdomen was decidedly tender with moderate tympanitic distention, although there was no visible peristalsis. No flatus was passed. Temperature was 99.4°F. but the pulse had risen to 102 though still of good volume. He vomited a small quantity of bilious matter. A differential leucocytic count showed 89 per cent polymorphonuclears.

A provisional diagnosis of "obstruction with commencing peritonitis" was made and laparotomy decided on. At 9-30 A.M. when the patient arrived on the table his general condition was good, with a temperature of 99.2°F. and a good volume pulse of 132 per minute.

Under C. E., the abdomen was opened by the paramedian right rectus incision. A

quantity of brownish chocolate-coloured fluid escaped, and a volvulus of the ileum was found. The volvulus consisted of nearly two clockwise turns. The mesenteric pedicle showed attached to it, a long filamentous peritoneal band stretching from the right iliac fossa. This band had pulled the mesentery taut and formed an axis of rotation for the gut. The gut involved was the lower portion of the ileum of which forty inches was gangrenous. The distal end of the volvulus was within three inches of the ileo-cæcal valve. There were signs of commencing peritonitis, with patches of flaky deposit of lymph and discoloration of the parietal peritoneum.

As the patient was taking the anæsthetic well and the pulse showed little change, a primary resection of forty-two inches of the ileum was done. The cæcal end of the ileum was closed and the proximal end was anastomosed to the side of the cæcum. A rather medially placed anterior tænia of the cæcum provided a convenient site for the anastomosis.

The fluid was mopped out and the abdomen was sutured in three layers. The patient left the table with a pulse of 134 p.m. and while in bed was given two pints of 5 per cent. glucose in normal saline intravenously.

Early after-treatment consisted of the Fowler position, six ounces of 5 per cent. glucose in normal saline rectally every six hours and sips of glucose solution by the mouth. On the second, third and fifth days of the operation intravenous injections of 10 c.c. of half per cent solution of 'mercurochrome 220 soluble' were given, with reactions ranging from two to four degrees of temperature. An offensive liquid motion was passed the day after operation. This was followed by further motions when diarrhoea set in—as many as thirteen motions being passed on the fourth day of the operation.

The wound which looked perfectly clean and dry till the eighth day showed partial failure of union when the stitches were removed. A pelvic pocket of pus and a minute faecal fistula (occasionally discharging liquid stools) developed. The pus drained off gradually, and the fistula closed up completely on the sixteenth day of its appearance.

The subsequent course of the case was uneventful, the patient making a steady and complete recovery. The operation had incidentally caused the disappearance of his inguinal hernia.

The clinical features of the case were:—

(1) Absence of early or severe vomiting though obstruction was in the small gut.

(2) The very moderate distension of the abdomen no doubt caused by the high obstruction.

(3) Absence of visible peristalsis usual in other forms of obstruction. This point was

quite in keeping with the condition found, as visible peristalsis would be exceptional where a distended loop of gut pressed on the gut above.

I am obliged to Dr. R. Dowden, Principal Medical Officer, Federated Malay States, for permission to publish this case.

AN INTERESTING CASE OF NÆVUS.

By D. M. BHATAVADEKAR, M.B., B.S., B.M.S.,
CAPTAIN, I.M.S. (HON.),
Resident Medical Officer, Special Prison Hospital,
Thana.

THE patient, T. B. B., was first seen on 30th November, 1924, and was kept under observation until 4th May, 1925, when he was shown to the Grant College Medical Society as an interesting case of nævus.

The interesting features of the case were as follows:—

(1) One huge extensive flat patch of pigmentation continuous on front and back of trunk and extending beyond the middle line of his body. In its widest part it was 25 in. horizontally and 10 in. vertically with hair growing from the border in the front (specially marked). A few hairs were also scattered here and there over the patch on the back and some of them had turned grey. (It was noticed that the hair on his head had not turned grey; he was a man of 25 years of age.) See figs. 1 and 2.

The condition was stated to be present from birth and was apparently a progressive one as it

Gray hair.

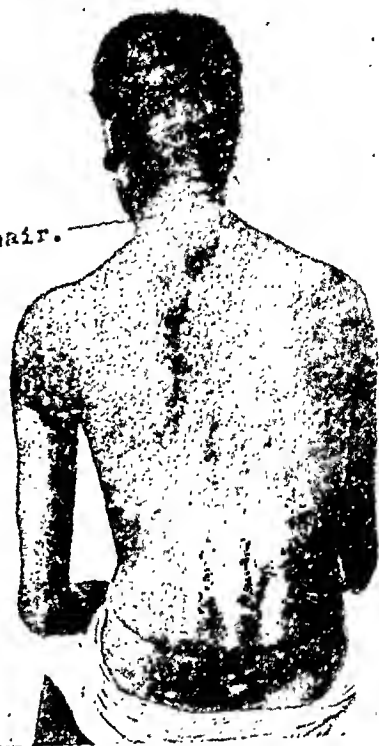


Fig. 2.—Back view.

was reported to have progressed from behind forwards over the left shoulder in this order,—first the patch of pigmentation spreading forwards followed by a hairy border.

(2) An irregular rugged tumour with slightly nodular feel extending from between the scapulae across the back of the neck up to the junction of the occipital with parietals and temporals. In its widest part it was 12 in., in its narrowest part 9 in., and had a few softened and degenerated lumps in it which appeared like sebaceous cysts or lipomata. As compared with (1) the growth was raised but less pigmented, and the hair had grown sparsely. (See fig. 2.) The tumour was painless and could be lifted from the tissues underneath and moved from side to side for a short distance; its size was not diminished by pressure nor the colour altered, neither did it show any changes on temporary stoppage of breath as coughing.

(3) Patches of hairy mole varying from 1 in. to 4 in. in size scattered all over his body,—20 in number. (See fig. 2.) Two patches can be seen just below the waist band.

(4) Numerous small moles, about 200 in number, scattered over his body; the majority with hair and a few without hair. (See figs. 1 and 2.)

(5) A few small patches of pigmentation on palms and mucous membrane of the hard palate, i.e., on areas normally devoid of pigment. The left scrotum and left inguinal canal were empty. The testis on this side was said to have disappeared

Advancing
hairy border.



Fig. 1.—Front view.

after some illness; perhaps it atrophied after mumps, but there was no lump felt in the scrotum which gave the sensation of being occupied by fibrous tissue. Congenital phimosis was also present in this case.

COMMENT ON THE NATURE OF THE CASE.

Bland Sutton in his book on tumours says that hairy moles are recognised as much by their pigment as by their hair, i.e., the two are constant. Pusey in his book on dermatology says moles are pigmented nævi, i.e., pigment and blood vessels are in excess and constant. Combining the two definitions, the hairy mole would seem to consist of three elements—all in excess of the normal—i.e., hair, blood vessels and pigment, which may, therefore, be termed *nævus pigmentosus et pilosus*. The case under review well shows this condition and also exemplifies other varieties of nævus such as flat (n. spilus), raised (n. verrucosus), and fatty (n. lipomatosus) nævi described by Pusey in his book on dermatology; the unique feature of the case being the presence of all these varieties in one person.

Regarding size, shape, distribution and number the case is also unique as nævi rarely exceed the size of the hand and though the shape varies with size, so that with larger nævi we find greater elevation, more hyperkeratosis, more papillomatous or warty surface, and a more exaggerated growth of hair, in this case we found the flat variety was more marked than the raised and hair growth was not abundant except at the growing margin. The number is usually one or two but may be unlimited; frequently when no large nævus is present there are many moles. In this case both small and large varieties were present, the former in large numbers (about 200).

Distribution is generally irregular and asymmetrical and may be upon any part of the body, but sites of predilection are the face,—especially forehead, neck and back; or may be along cutaneous nerves, blood vessels, metameric segments of skin and embryonic sutures. In the present case moles were scattered all over the body and were not confined to any one particular region, blood vessel or nerve, thus differing from a neurofibroma. In (2) the condition was sharply limited at the junction of the occipital with the temporal, whereas if the temporal was involved the condition might have been mistaken for cirroid aneurysm. The condition was present from birth, therefore the excessive pigmentation must have been due to deposit of excess of melanin by prickle-cells. Its presence on the palms and the mucous membranes of the palate-sites normally devoid of pigment is curious.

The exact nature of these growths can only be told by microscopic examination of a section of the growth. This was not done lest a malignant change occurred—a real danger ever present in such cases—and because practically nothing can be done by way of treatment in such an

extensive condition which, however, was not painful and only slightly disfiguring.

We, therefore, conclude with Pusey that nævi are developmental defects and that the causes of their occurrence are altogether obscure with no hereditary tendency (although in this case it was stated that the great-grandfather had a very similar pigmentation of skin).

My thanks are due to my cousin, N. B. Bhata-vadekar, B.A., M.B., B.S., for pointing out the detailed literature in Pusey's book on dermatology, and to Colonel Murray, I.M.S., the Inspector-General of Prisons, Bombay Presidency, for his kind permission to publish this case.

ACCIDENTAL "MARKING-NUT" DERMATITIS.

By R. W. SCANLON,

Assistant Surgeon, Civil Hospital, Berbera, British Somaliland.

THE "marking-nut" in India, according to Lyon's "Jurisprudence," is occasionally used with criminal intent and sometimes therapeutically.

The case responsible for this note commenced with the therapeutic application of the juice of the marking-nut for ringworm of the scalp.

The patient after the application of the juice to his scalp did not consider the likelihood of vesication of parts with which the juice came in contact, and noticed after 4 days an erythematous patch on his left arm over the biceps region which reminded him that he had been using his arm as a pillow shortly after he had applied the juice to his scalp.

Twenty-four hours later the patch had the appearance of herpes and was extremely irritable. He also noticed isolated herpetiform patches on his left forearm and wrist which he attributed to the secretion from the ruptured vesicles. Crops of vesicles and papules appeared on the chest also.

The chief complaint of the patient was intolerable itching. He denied any tingling or pain before the crops appeared.

It is difficult to state whether the secretion from vesicles produced by the juice also has the effect of a vesicant, and it was intended to try this on the patient and a volunteer but the former refused and has not been seen since.

The scattered crops of vesicles were in all probability the result of splashing with some of the juice when it was applied to the head, and the large patch on the arm the result of direct contact.

The history of the case and the presence of the large 'contact' patch were the main facts in the diagnosis which would have been otherwise very difficult.

My thanks are due to Dr. R. S. Taylor, Senior Medical Officer, Somaliland Protectorate for permission to record these notes.

Oct., 1925.]

Indian Medical Gazette.

OCTOBER.

LEPROSY RELIEF FUND.

It is likely that this fund will soon be closed. The subscriptions which have been received up-to-date are, on the whole, distinctly disappointing, they will not be sufficient for the institution of a plan of campaign which will enable India to make a great forward stride towards the solution of the leprosy problem. Leprosy has in the past been the Cinderella of tropical diseases and it is only the great efforts of Sir Leonard Rogers and Dr. Muir which have made India a factor of importance in the advancement of our knowledge of leprosy. It is now high time that the discoveries of these and other workers should be made available for the prevention and cure of leprosy in this country. It is believed that the policy of the governing body of the relief fund will be to promote research work in leprosy, to provide facilities for training medical men who will be engaged in the treatment of the disease, to improve the teaching of leprosy in the medical colleges and schools and to make grants to the clinics which will be opened for treatment of the disease. It is expected that a considerable proportion of the contributions from each province will return to the local committee in the form of grants from the central fund.

There is thus a special incentive to local committees to raise as much money as possible. It is obviously undesirable that the whole of the funds should be spent in the form of grants in aid of the local bodies, if this were done there would be no money for research, teaching and propaganda, all of which activities can be carried out more efficiently by a central organisation than by local effort.

Some of the provinces have not lived up to their reputation for generosity in the matter of contributions. Bengal has done very badly while Bombay has done fairly well.

It is anticipated that the total yearly income of the fund will hardly exceed a lac of rupees. At the present time something like twelve lacs of rupees are spent yearly in providing for a small fraction of the pauper lepers of India, so that it is obvious that a lac a year would be a drop in the bucket as far as provision of hospitals and colonies is concerned. For this reason it seems to be a wise policy on the part of the committee of the fund to concentrate their efforts on research, teaching, propaganda and the aiding of early treatment clinics. Even with the small sum that is available a good deal can be done in these directions, but unless a more generous response is made before the fund closes it is not likely that the Association will

be able to consider any ambitious schemes for dealing with the leprosy problem in India.

We do not expect our readers to contribute large sums but they might well bring the claims of the fund to the notice of their wealthier patients.

THE CAUSE OF CANCER.

DURING the early days of August the curiosity of the medical profession in India was much whetted by the advance press publicity which was given to the work of Dr. W. E. Gye and Mr. J. E. Barnard on the subject of the causation of cancer so that their communications to the *Lancet* of July 18th have been read with special interest. To us in India the one great outstanding feature of cancer is the fact that many of the forms of the disease seen in this country appear to be definitely associated with chronic irritation of various kinds, and in spite of many pieces of valuable experimental work which have been done by others the production of the disease in rabbits and mice by painting with tar appeared to have the closest bearing on the causation of the disease. It was by no means certain that irritation in itself was the cause of the disease but it was clear that the experimental animals and many of the human victims of cancer would not have suffered if they had not been subjected to prolonged local irritation. From the practical point of view irritation was thus shown to be an essential factor in many cases whatever other factors may have been at work. It is freely admitted that the change produced in the tissues by irritation may only be a cause in so far as it prepares the ground for some causal factor, but if so the causal factor must have a pretty wide distribution and must be lying in wait ready to assert itself when the necessary local conditions are brought about. Of the other significant pieces of experimental work it is necessary to refer to the work of Ribbert who showed that the disease in the beginning is purely local, to that of Hanau who showed that certain rat tumours could be transplanted from animal to animal, to that of Peyton Rous who transmitted a fowl sarcoma by the injection of filtered cell-free extracts of the tumour, and to the work of Fibiger who produced cancer in the stomach in rats by infecting the animals with a nematode. We now have the work of Gye and Barnard who have brought forward strong evidence that there is a filtrable virus which cannot by itself cause cancer, but which in conjunction with virus-free cancer extracts can produce malignant growths under certain conditions.

It is now asserted that the work of Gye and Barnard has been anticipated by Prof. Keysser for whom some leading German scientists claim the credit of the discovery. Of this it is likely that more will be heard in the near future, but it is impossible to deal with the question until the facts are available, and in the meantime we are concerned with the reports of Dr. Gye

and Mr. Barnard as published in the *Lancet*. Dr. Gye points out that filtrability of a virus is often relative property for instance some clearly visible spirochaetes are filter-passers, while the virus of vaccinia though a filter-passer under certain conditions is non-filtrable as it occurs in calf lymph. He next details the best method of obtaining an infective filtrate, he grinds up healthy tumour tissue with sterile sand and mixes it with Ringer's fluid then coarsely filters the material through layers of paper pulp and sand and passes the filtrate through a Chamberland 12 candle. The best culture medium for the virus is Hartley's broth to which is added 0.2 per cent. KCl. The broth is sterilised by steaming and fresh rabbit serum is added. Special precautions are needed to ensure that the tumour material is not contaminated by secondary infection during the process of excision. The injection of 1 c.c. of a tumour filtrate from Rous' chicken sarcoma caused tumour formation in the pectoral muscle of a chicken, but the filtrate ceased to be effective in a few days, not because the virus has died out but because of the disappearance of an accessory chemical factor, as was shown by adding primary culture of the virus to a virus-free tumour extract when the combination of the two substances caused a tumour, though each of them singly was ineffective even in large doses. It was thus shown that both the virus and a tumour extract was needed to cause the disease. It was found that the virus could be separated to a large extent from the tumour filtrate by centrifugation and hence is probably particulate while the other factor could not be so removed and so is probably a chemical substance. It was further found that the virus is effective in causing tumours in many kinds of animals and therefore is not specific for any particular animal, while the virus-free tumour extract is strictly specific; so that an extract from a tumour of a mouse when injected with the virus will not cause a tumour in a pigeon but will produce a tumour in another mouse. Apparently the virus which is to some extent capable of being cultivated is one of the common factors in tumour formation and it appears to be the same in tumours from various kinds of animals, while the essential adjuvant which results from some change in the affected tissues due to irritation or other cause, is strictly specific for each animal. It remains to find the nature of the chemical adjuvant and Dr. Gye says that some of the "relatively unimportant" chemical irritants like coal tar and paraffine are already known. These may be unimportant in that they are not responsible for the causation of a large number of cases of human cancer, but they are surely of vast importance as definite examples of the chemical factor in cancer causation and hence as clues to the discovery of the nature of this factor. It would also appear to be reasonable to argue that the virus which is at work is of widespread distribution while the suitable tissue condition which enables the virus to become effective is the more

important and the more easily controlled factor in cancer causation. The uniformity with which the Japanese workers Yamagiwa and Ishikawa produced cancer by application of tar and the frequency with which the *kangri* can cause skin epithelioma among Kashmiris suggest that the virus is almost universally distributed in nature and that the local conditions determine the frequency or rarity of the disease. We have not heard the last of the virus, its discovery may have very far-reaching consequences, but it is important that attention should continue to be paid to the tissue irritants which may turn out to be the more important factors in the long run. The contribution of Mr. J. E. Barnard is very remarkable. Mr. Barnard is a business man who has for long been known as a leading expert in microscopy and by specially designed methods of dark-ground illumination which are described in the paper he has been able to obtain satisfactory photographs of the filter-passing virus of pleuro-pneumonia of cattle and of the much smaller virus of the Rous fowl sarcoma.

The appliances used are exceedingly ingenious, they appear to be essentially the same in principle as the Zeiss quartz condenser by which objects can be photographed with very short wave lengths of ultra violet light, but apparently the quartz objectives which used to be listed by Zeiss have not been employed, these had the disadvantage that they could not be used for visual purposes and so it is likely that their greater resolving powers cannot readily be made use of in practice. Altogether it would appear that an important advance has been made in the cancer problem, one which may even lead to its final solution, but there are obviously two separate lines of attack on the cancer problem, the one which is suggested by the work of Dr. Gye which consists in trying to discover the nature and distribution of the "virus" while the other is the discovery of the local conditions which prepare the field for the action of the virus. The old question of the soil and the seed is raised; our attention is specially called to the seed by Dr. Gye's work, but if the seed should turn out to be so widely distributed in the bodies of animals as to be almost universal and if it is not possible to eradicate the seed by vaccines or other means, we shall be compelled to fall back on the other line of attack which will consist in finding out how the soil is prepared for the seed and in preventing that preparation from taking place. In many forms of cancer we do know how the soil is prepared, for example in *kangri* cancer, in tar cancer, in paraffine cancer, in radiologist's cancer and in several other forms of the disease. It is difficult to understand why these obvious clues have not attracted greater attention in the past, and it is to be hoped that they will not be neglected by the many skilled investigators who are devoting themselves to the discovery of the cause of cancer.

Even if the factor which has been discovered by Dr. Gye is proved to be the virus of cancer,

it is far from constituting a solution of the cancer problem. A solution will only have been obtained when we know how to prevent or to cure the disease, and it is to be feared that many victims of cancer in the next generation will have too good grounds for complaining that we have not enabled them to escape from the dread disease. We can already tell the Kashmiris how to avoid their *kangri* epithelioma, we can tell the radiologists how to avoid cancer of the hands, we can tell the *pan* chewer how to avoid cancer of the mouth, if we follow up these very obvious clues we may even be able to find out how to avoid most forms of cancer, merely by removal of some unfavourable environmental condition. Is it that such a line of attack is too obvious and too simple to be worthy of the attention of investigators? Anyhow the sky is clearing a little, perhaps we are nearer to the dawn than we imagine.

SPECIAL ARTICLES.

PATHOLOGICAL EVIDENCE BEARING ON DISEASE INCIDENCE IN CALCUTTA.

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(*Glasgow Medical Journal*, January, 1925.)

THIS paper is of such interest and importance that we have no hesitation in giving our readers the benefit of extensive extracts from it. Much has been written on the incidence of special diseases in the tropics, but far less is known regarding that of world-wide diseases in hot countries. Nor is this surprising in view of the very backward position of vital statistics in such countries as India, where only a very small percentage of fatal illnesses are seen and diagnosed by qualified medical men, while the only accurate data refer to the selected men of the middle period of life of the British and Indian armies, and of the causes of death of the temporary inhabitants of the jails. In a few of the largest cities of India the death returns are of some value, although far inferior to those of British towns, but the statistics of the mortality among the general civil population, returned as they are by uneducated village watchmen, are so grotesquely inaccurate that, during an inquiry in the fever-stricken Bengal district of Dinajpur in 1904, Sir Leonard found that 65 out of every 66 cases of such a definite disease as dysentery had been returned incorrectly as under the elastic heading of "fever," which commonly includes about 90 per cent. of all the deaths. For accurate information regarding disease incidence in India we must therefore turn to the post-mortem records of the few medical colleges, those of the premier one of India at Calcutta having exceptionally good records.

The results of 1,600 post-mortems are analysed in this paper and compared with 1,000 medical post-mortems analysed on precisely similar lines at St. Mary's Hospital, London. Sir Leonard has also classified 1,000 tumours of which microscopical examinations had been made in the St. Mary's pathological laboratory for comparison with 1,190 tumours examined by him in Calcutta between 1910 and 1919 inclusive.

Percentages of Total Calcutta Mortality Due to Tropical Diseases.

| Disease. | 1,600 post-mortems. | | Vital statistics, excluding children under 5 years. |
|--------------------------|---------------------|--------|---|
| Malaria .. | 1.56 | } 9.99 | } 6.2 |
| Kala-azar .. | 8.06 | | |
| Plague .. | 0.37 | | |
| Cholera .. | 9.69 | | 0.15 |
| Amœbic dysentery .. | 5.69 | | 9.0 |
| Bacillary dysentery .. | 4.12 | } 10.5 | } 9.3 |
| Doubtful forms .. | 0.69 | | |
| Amœbic liver abscess | 2.69 | | 1.8 |
| Infantile liver .. | .. | | 2.4 |
| Ankylostomiasis .. | 0.19 | | .. |
| Beri-beri .. | 0.37 | | 0.1 |
| Leprosy .. | .. | | 0.4 |
| Total .. | 33.43 | | 29.35 |
| +Half-doubtful fevers .. | .. | | 3.9 |
| Total .. | .. | | 33.25 |

Fevers and dysenteries form the great majority of tropical diseases in the Calcutta series, the total amounting to just one-third of the whole in each series; percentages of the different non-tropical diseases can be obtained by a very simple calculation from those of the total number of cases.

In discussing the comparative prevalence of different diseases in the two series it will frequently be necessary to take into account the very great differences in the age distribution of the two sets of figures, especially as regards those under 10 and those over 50 years of age.

Age Incidence of Total Medical Post-mortem, in Calcutta and London.

| Years. | Calcutta. | | St. Mary's Hospital, London. | | Census Figures. | |
|----------|-----------|----------------|------------------------------|----------------|-----------------|----------|
| | All ages. | Over 10 years. | All ages. | Over 10 years. | Bengal. | England. |
| Up to 10 | 2.5 | .. | 16.9 | .. | 28.62 | 20.96 |
| 11 to 20 | 13.4 | 13.8 | 10.2 | 12.2 | 21.93 | 18.98 |
| 21 to 30 | 35.3 | 36.3 | 12.1 | 14.6 | 17.82 | 17.32 |
| 31 to 40 | 27.4 | 28.1 | 12.3 | 14.8 | 13.77 | 15.53 |
| 41 to 50 | 13.3 | 13.7 | 16.5 | 19.9 | 9.51 | 11.53 |
| 51 to 60 | 5.8 | 6.0 | 20.0 | 24.1 | 5.19 | 7.98 |
| Over 60 | 1.9 | 2.0 | 12.0 | 14.4 | 3.16 | 8.02 |
| Over 50 | 7.7 | 8.0 | 32.0 | 38.5 | 8.35 | 16.00 |
| Over 40 | 21.0 | 21.7 | 48.5 | 58.4 | 17.86 | 27.53 |

Children up to 10 years are far fewer (2.5 per cent.) in the Calcutta than in the St. Mary's figures (16.9 per cent.), as is also the case between 51 and 60, namely, 5.8 per cent. in Calcutta to 20 per cent. in London, and above 60 with only 1.9 in Calcutta to 12 per cent. at St. Mary's.

The percentages of deaths in the two post-mortem series in the main groups, together with the Calcutta vital statistics for all ages over 5 years are given in a table from which tropical diseases are excluded.

Percentages of Deaths in the Main Groups of Diseases.

| Group. | Calcutta post-mortems. | London post-mortems. | Calcutta vital statistics, less children under 5 years. |
|----------------------|------------------------|----------------------|---|
| General | .. | .. | .. |
| Tuberculosis .. | 9.23 | 6.1 | 9.5 |
| Circulatory .. | 21.93 | 13.4 | 21.5 |
| Respiratory .. | 10.50 | 20.3 | 5.4 |
| Digestive .. | 27.13 | 16.8 | 48.7 |
| Urinary .. | 12.00 | 7.5 | 7.2 |
| Nervous .. | 6.35 | 8.6 | 1.8 |
| Malignant Disease .. | 7.41 | 11.9 | 4.1 |
| Remainder .. | 4.59 | 13.8 | 1.21 |
| .. | 0.84 | 1.6 | .. |

The Indian series show considerable excess in general, and especially in tubercular disease, and in diseases of the respiratory and digestive systems, while the English series show great excess in circulatory diseases and in malignant tumours, and less marked increase in those of the nervous and genito-urinary groups, in spite of tropical diseases having been excluded in estimating the Calcutta data. A further analysis of the principal diseases of the different groups is made.

Percentages of General Diseases including Tuberculosis.

| General Diseases. | London post-mortems. | Calcutta post-mortems. | Calcutta vital statistics. All ages. | Over 5 years. |
|----------------------|----------------------|------------------------|--------------------------------------|---------------|
| Anæmia | .. 1.5 | 2.34 | 0.6 | 0.9 |
| Leukæmia | .. 1.7 | 0.27 | .. | .. |
| Diabetes | .. 0.7 | 0.18 | 0.4 | 0.6 |
| Diphtheria | .. 0.5 | 0.18 | 0.37 | 0.1 |
| Septicæmia | .. 0.5 | 3.00 | 1.07 | 1.2 |
| Tetanus | .. 0.1 | 2.05 | 6.04 | 1.1 |
| Typhoid | .. 0.3 | 1.21 | 2.2 | 2.9 |
| Tuberculosis. | | | | |
| General | .. 3.5 | 3.09 | 4.13 | .. |
| Meningitis | .. 2.4 | 1.04 | .. | .. |
| Pulmonary | .. 5.4 | 16.10 | 14.00 | 20.4 |
| Primary | .. } 0.0 | 1.04 | .. | .. |
| Intestinal | .. } | .. | .. | .. |
| Peritonitis | .. 0.8 | 0.05 | .. | .. |
| Other focus | .. 1.0 | 0.09 | 0.76 | 1.0 |
| Total | .. 13.4 | 21.93 | 14.76 | 21.4 |

Anæmia is more common in Calcutta. Leukæmia, on the other hand, was more frequent in London, but in Calcutta, the disease is more likely to be overlooked in view of the frequency of very large spleens due to kala-azar and chronic malaria.

Diabetes is shown as being several times more common as a cause of death in London than in Calcutta. This disease is not common among the very poor classes, who comprise the vast majority of the post-mortem cases, and cannot afford the quantities of sugar consumed by their wealthier compatriots, indicating that the prevalence of diabetes among the latter is of dietetic origin, and not due to any racial characteristic.

Diphtheria caused only 0.18 deaths in the Calcutta post-mortems as compared with 0.5 in the London series, but this is due to the rarity of admissions, and still more of post-mortems on children in the Calcutta Hospital, for the Health Officer's figure is 0.37 including children, which is probably below the truth on account of defective diagnosis.

Septicæmia, including pyæmia, but not puerperal cases, shows the high rate of 3 per cent. in the Calcutta post-mortems and 1.2 per cent. in the Health Officer's figures, omitting children under 5 years, against 0.5 per cent. in the London post-mortems, which well reflects the greater dangers of septic infections in the hot, moist, germ-laden atmosphere of Bengal, and is of great interest in connection with the universal secondary infection of the originally sterile pus of amœbic liver abscesses after the open operation in Calcutta and other damp tropical climates, as was shown by Sir Leonard twenty years ago. Hence his advocacy of the now generally adopted method of aspiration, combined with the administration of ipecacuanha or emetine, which has reduced the death-rate from the former figure of 60 to 70 per cent. to only 1.6 per cent. in 186 recent cases treated by his methods by Dr. K. K. Chatterji in Calcutta.

Tetanus shows the very high figure of 2.05 per cent. in the medical post-mortems in Calcutta, against only 0.1 per cent., or one-twentieth as many in London, while the Calcutta Health Officer's returns show the appalling rate of 6.04 per cent. of the total deaths for all ages, although in those over the age of 5 years the rate is

only 1.1, which is still eleven times that of the London series. Of the total number of 906 deaths in the 1921 health returns, no less than 785 were infants, nearly all due to infection through the umbilical cord on account of the insanitary dressings, often including cowdung, applied by ignorant Indian midwives. The frequency of tetanus in adults is also well known, and is easily explained by the discovery by Sir Leonard, many years ago, that if a minute pinch of dust of a Calcutta main road was placed under the skin of rats, five out of six died of tetanus. This led him to advocate the general prophylactic use of anti-tetanic serum in all wounds and abrasions contaminated by dust at this hospital, and it is of interest to note that, although 20 cases occurred in the first 1,000 post-mortems he performed in Calcutta, among the last 600 the number was only 2, indicating the great preventative value of the serum.

Typhoid fever caused 1.21 per cent. of the deaths in the Calcutta as compared with 0.1 per cent. in the London post-mortems, the very low London rate being only partially explained by such cases being rarely admitted to the general hospitals at the present day, while the much higher Calcutta hospital figure is confirmed by the Health Officer's return of 2.9 per cent. in those over 5 years and 2.2 in the total cases. Yet, when Sir Leonard went to the Calcutta Medical College Hospital in 1900, it was very generally held by the medical profession in Calcutta that typhoid scarcely ever occurred in natives of India, while only three cases had been recognised in ten years in the large Medical College Hospital, although by the Widal test he was able to show, in 1900, that there were six unrecognised cases in the wards at one time, such cases being up to then returned as remittent malaria, and one of the first papers he published after going to Calcutta was entitled "Typhoid as a common continued fever of natives in Calcutta." He found later that typhoid is particularly common among Indian children, and it is now generally acknowledged that the incidence of typhoid is far higher in India than in this country, and that all Europeans going to reside in the tropics should be inoculated against typhoid.

Tuberculosis.—In a previous paper Sir Leonard recorded a detailed analysis of the tubercular cases among 3,341 Calcutta Medical College post-mortems, showing that in 18.3 per cent. of the medical cases tuberculosis was the cause of death, while in 7.2 per cent. more it complicated other fatal diseases, including a number of latent lesions of recovered tubercle, making a total of 25.5 per cent. revealing well-marked tubercular lesions. Yet, a very experienced I.M.S. officer at the 1892 Berlin International Tuberculosis Congress, speaking as Government of India delegate, stated that phthisis and other lung diseases were rare among natives of India, apparently on the strength of a statement he made that only 3 per cent. of the deaths which had been inquired into in one province had been returned as due to phthisis—a striking example of relying on the official returns of deaths reported by untrained and ill-paid agencies, and ignoring the available Calcutta post-mortem records, where this very officer worked during most of his service. The figures show that tuberculosis accounts for no less than 21.93 per cent. of the non-tropical Calcutta post-mortems, against 13.4 per cent. in the London data, by far the highest figure for any one disease, and much in excess of any of the common tropical diseases. In considering the incidence of the different classes of tubercular disease, the very small proportion of children under 10 years in the Calcutta series must be taken into account, for he finds that the combined figures of general tuberculosis and tubercular meningitis form 62.7 of the London, but only 6.7 per cent. of the Calcutta cases, were in children not over 10 years of age, so that the real incidence of these acute types must be considerably greater in the Calcutta series, instead of being somewhat less as indicated by the figures. On the other hand, the three-fold greater incidence of pulmonary cases in the Calcutta series is no doubt partly due to such cases being less commonly

admitted to London general hospitals, although the fact that the Calcutta Health Officer's returns show an incidence of 20.4 per cent. of pulmonary phthisis deaths among non-tropical diseases, or higher even than the post-mortem figure, while the city tuberculosis death-rate was 2.14 per mille of population fully confirm the terribly high tubercular incidence in Calcutta, due largely to overcrowding, assisted by the purdah system, as proved by the rate among females being three times as high as among males. Moreover, in an inquiry into the causes of death in the malarious Bengal district of Dinajpore in 1904, he obtained clear evidence of not less than 9 per cent. of the deaths being due to pulmonary tuberculosis in the villages, while it is also certain that the disease runs a more acute course in Bengal, as well as in Bombay, as shown recently by Dr. A. Powell, than in Great Britain; so the importance of the tuberculosis in India can scarcely be exaggerated.

Another point is the frequency of primary intestinal tuberculosis with extensive intestinal and abdominal glandular affection, but little or no involvement of the lungs. In several cases Sir Leonard inoculated rabbits with such tubercular material without ever producing the bovine type of the disease—an interesting fact, which is in accordance with the rarity of surgical forms of tuberculosis in Calcutta as compared with Europe which he attributed to the absence of infection of cattle to any material extent in Bengal and most parts of India, and the universal custom of boiling milk before it is consumed by Indians. The explanation of the frequency of primary human intestinal tuberculosis of the bowel in Calcutta which is infection through food owing to the Bengali habit of unrestrained expectoration by phthisical as well as healthy persons. Secondary intestinal infection in pulmonary tuberculosis was found in no less than 65.9 per cent. of his Calcutta series, against 23.9 per cent. in Osler's data, while laryngeal tubercle only occurred in 9.1 per cent. in Calcutta against 18 to 30 per cent. of Osler's and 50 per cent. of Percy Kidd's London figures—these differences being explainable by the greater stress of cold climates on the larynx and in hot ones on the digestive system. Tubercular pericarditis and pneumothorax were also rather more frequent in Calcutta.

Lobar pneumonia, so far from being rare in Bengal, actually equals tuberculosis of that organ as the greatest single cause of death in the Calcutta records with 16.03 per cent. against 16.10 for phthisis, and it is also a good second in the Health Officer's returns for all over 5 years with 17.9 against 20.4 per cent. for pulmonary tuberculosis, while it is essentially a disease of the prime of life, for no less than 70 per cent. occurred between the ages of 21 and 40, so that when a well-nourished body of such an age appeared on the post-mortem table the cause of death was generally lobar pneumonia or cholera. The race incidence was highest among the Hindus, distinctly lower among the Mahomedans, and much below the average in the few European subjects of the earlier records, which is in accordance with the relative resisting powers of the three classes to cholera and other acute infections. He found that 42 per cent. occurred in the four coldest months of November to February, 31 per cent. in the four very hot months of March to June, and 27 per cent. in the four rainy ones of July to October, with intermediate temperatures but a smaller diurnal variation than in the other two seasons, and commonly extending over 20°F., and sometimes to over 30°F. when the frequent sudden heavy rain storms occur in the hot season. A still more important cause of the remarkably high pneumonic rate is a combination of overcrowded, often one-roomed houses, of the poorer classes in Bengal, and the favourable influence of the hot climate on the life of the delicate streptococcal group of organisms outside the human body increasing the chances of infection. Gangrene of the lung is a much more common sequela of lobar pneumonia in Calcutta, apparently due to deficient resisting power of the Bengalis.

Percentages of Systemic Diseases.

| System. | London post-mortems. | Calcutta post-mortems. | Calcutta vital statistics over 5 years. |
|----------------------------|----------------------|------------------------|---|
| Respiratory— | | | |
| Lobar pneumonia .. | 4.2 | 16.03 | 17.9 |
| Broncho-pneumonia .. | 6.1 | 5.80 | 13.9 |
| Bronchitis .. | 4.7 | 3.00 | 14.5 |
| Pleurisy and empyema .. | 1.2 | 1.30 | 0.2 |
| Others .. | 0.6 | 1.00 | 1.2 |
| Total .. | 16.8 | 27.13 | 47.9 |
| Circulatory— | | | |
| Ulcerative endocarditis .. | 2.6 | 1.50 | .. |
| Rheumatic endocarditis .. | 3.7 | 0.00 | .. |
| Pericarditis .. | 0.4 | 0.75 | 3.8 |
| Aortic valve disease .. | 2.6 | 2.73 | .. |
| Mitral valve disease .. | 4.3 | 0.93 | .. |
| Atheroma .. | 2.4 | 1.41 | .. |
| Aneurysm .. | 3.2 | 1.59 | 0.69 |
| Others .. | 1.1 | 1.59 | 1.30 |
| Total .. | 20.3 | 10.50 | 5.19 |

Broncho-pneumonia shows very similar incidence in the two post-mortem series, of 6.1 and 5.8 respectively for Calcutta and London, but the health returns for Calcutta show the much higher figure of 13.9 per cent. for all over 5 years of age, largely due to the great influenza epidemic in 1918-19. The comparatively low hospital rate is mainly due to the few admissions of children to the wards.

During the influenza outbreak, a conglomerate type of broncho-pneumonia, not previously seen, at once became extremely prevalent, the observation of which should enable a serious influenza outbreak to be immediately recognised.

Bronchitis shows precisely the same features as broncho-pneumonia, with which the former disease so frequently terminates in both the young and the old, so further comment is unnecessary. Pleurisy and empyema, as well as other rarer lung diseases, also show very similar figures in the two post-mortem series.

The total deaths from the above lung diseases are greatly in excess in Calcutta post-mortems, namely, 27.12 to 16.8 per cent., due entirely to the great amount of lobar pneumonia, while the much higher figure of 47.9 per cent. in the health returns for Calcutta is due to all secondary terminal lung affections tending to be certified as pneumonia or bronchitis, while in my tables, deaths from terminal lung complications of such diseases as kala-azar, dysentery, etc., have been entered under the primary disease.

Circulatory Diseases.

Here we meet with precisely the opposite condition to lung diseases, namely, twice as high an incidence in the London as in the Calcutta post-mortem series, the explanation of which is of very especial interest, mainly on account of the nearly, if not complete, absence of rheumatic endo- and pericarditis in Bengalis, who have not visited a cold climate or a hill station. It is seen that the London series gave 3.7 per cent. of deaths from rheumatic endocarditis, often complicated with pericardial inflammation, against 0.0 in the 1,600 Calcutta cases, but still stronger evidence is afforded by the fact that in the 4,800 post-mortems in the thirty-seven years up to 1909 there was only one case returned as rheumatic endocarditis, and that was in an Anglo-Indian subject, who had almost certainly visited a cold climate. In the pathological museum of the Medical College, dating from that of the Medical and Physical Society of Bengal, founded about 1825, there is only one specimen from a Bengali subject recorded as having been due to "rheumatic fever" and resembling that condition anatomically, although in the absence of

bacteriological examination it is impossible to exclude endocarditis due to either the pneumococcus or the gonococcus—the latter, in particular, not very rarely producing articular conditions in Calcutta not unlike the rheumatic variety.

Ulcerative or malignant endocarditis, on the other hand, is by no means rare, the twenty years' Calcutta records showing 1.5 per cent. against 2.6 in the London series, where rheumatic endocarditis may develop into the ulcerative form. Sir Leonard found the pneumococcus by far the most frequent organism in the damaged valves, as might be expected from the incidence of lobar pneumonia. It is also of interest to note that in the Calcutta cases the aortic valve was considerably more frequently affected with the ulcerative disease than the mitral, while the reverse is the case in Osler's figures, doubtless on account of the rarity of antecedent rheumatic endocarditis in Bengal. In the London series of rheumatic endocarditis the average age of the patients was 14.3 years, while that of malignant endocarditis was 32.6 years, while the Calcutta series of malignant endocarditis works out at just 32 years, or the same as the malignant endocarditis cases in London, and more than twice as high as that of the rheumatic endocarditis ones; which once more confirms the absence of any material amount of rheumatic endocarditis in Calcutta.

The percentage of cases in which the primary cause of death was attributed to pericarditis was 0.75 in Calcutta, but only 0.4 per cent. in London, just the reverse of the rheumatic endocarditis, indicating a difference in etiology. Only 1 of 102 cases of pericarditis or less than 1 per cent. was classed as possibly of the rheumatic form; 14 were of septic origin accompanying pyæmia, dysentery, liver abscess, etc.; 10 were tubercular; 1 complicated Bright's disease and 2 cirrhosis of the liver, and the remaining 74 were secondary to pneumonia in 65, empyema in 5, acute pleurisy 3, and congestion of the lung in 1. Of the 65 secondary to pneumonia, in 32 the pericarditis was marked, and in 33 it was slight, usually only at the base of the heart around the large vessels, not resembling the rheumatic form, and unaccompanied by endocarditis, except in one ulcerative case—a very different state of affairs to rheumatic endocarditis, which is so commonly complicated by pericarditis. One doubtful case is the only possible evidence of rheumatic endocarditis in 4,800 post-mortems spread over thirty-seven years. The frequency of pneumococcal pericarditis, on the other hand, was often confirmed by bacteriological examination, while it was secondary in an equal number of cases to pneumonia, taken with the great frequency of lobar pneumonia. In Calcutta, the pneumococcus takes the place of the rheumatic fever organism as the principal cause of pericarditis in Bengal.

Valvular cardiac disease.—In London mitral valvular disease was the primary cause of death in 4.3 per cent., and aortic valvular affections in only 2.6 per cent., whereas in Calcutta the figures were reversed, with only 0.93 per cent. of mitral disease, or but little over one-fifth of that in London, while aortic disease was responsible for 2.7 per cent., or nearly three times as many as mitral. This suggests that the comparative rarity of mitral disease, and especially of mitral stenosis, so typical of the after-effects of rheumatic endocarditis, which constituted nearly all the mitral cases in Calcutta as well as in London, is due to the extraordinary rarity of rheumatic endocarditis and pericarditis. In the London series the average age at death of the mitral stenosis cases was only 31.8 years, while in the case of aortic valve disease it was no less than 51 years, whereas the Calcutta series worked out from the 25 cases of mitral stenosis in 4,800 post-mortems in thirty-seven years, which was all there were to be found—although G. Samways reported no less than 70 in four years Guy's Hospital post-mortems—the average age was very nearly the same as in the aortic valve cases, namely, 30 years in the mitral and 32.3 years in the aortic cases—a very striking difference from the London data.

The average age of the London aortic cases is much higher than that of the Calcutta series. Out of the 25 London cases in which the age at death was recorded, no less than 14 were over 50 years of age, while none of the aortic cases in the last 600 Calcutta were over 50 years of age. This is a most significant difference, which indicates that the atheromatous disease producing aortic valve affections in Calcutta belongs to the syphilitic variety of middle age, while many of the London ones were of the later life degenerative type of atheroma, while syphilis is very common among the class of patients furnishing Calcutta autopsies. In 12 out of the 25 mitral stenosis cases in Calcutta, a greater or less degree of actual atheroma, usually of the aortic valves, was also present, while in no less than 87.8 per cent. of the fatal aortic valvular disease definite atheroma was found, in all but 15.8 per cent. of which it was of a marked or very marked degree, while in several of the mitral stenosis cases gummata were found also in the internal organs. Sir Leonard concludes that both aortic stenosis and regurgitation, and mitral stenosis in Calcutta are mainly, and probably very frequently, caused by syphilis.

Atheroma and aneurysms were nearly twice as frequent in the London as in the Calcutta series. The majority of the aneurysms in Bengalis occurred below the age of 41, and in London the majority were over 50 years of age, syphilis once more being the outstanding cause in Bengal, somewhat mitigated by the low blood-pressure of Indians, especially of the vegetarian Hindus.

From an analysis of 1,000 Calcutta cases and 300 London cases, there does not appear to be definite evidence of any material difference in the two series, and certainly no evidence of premature arterial degeneration in the Bengali race. In those over sixty years of a considerably higher percentage of the London series showed a marked degree of atheroma, but this is clearly due to there being many more elderly men in England.

Digestive Diseases.

The digestive system also presents differences of great interest.

Gastric and duodenal ulcers were twice as frequent in the London as in the Calcutta post-mortem; a figure which is below the truth on account of a larger proportion of operations having been undertaken for these conditions at St. Mary's Hospital, the unsuccessful cases appearing in the surgical post-mortems, which are not included in my tables, although they were twice as numerous, namely, 45 among 805 surgical cases, which bears out the general opinion that these diseases are less common in tropical races, although they are by no means very rare, and the exact causes of the difference are not known, although they have been attributed to differences in diet.

Percentages of Systemic Diseases.

| System. | London post-mortems. | Calcutta post-mortems. | Calcutta vital statistics, over 5 years. |
|-----------------------------|----------------------|------------------------|--|
| <i>Digestive—</i> | | | |
| Gastric and duodenal ulcers | 2.1 | 0.92 | .. |
| Enteritis | 2.0 | 1.42 | 4.1 |
| Cirrhosis of liver | 1.3 | 5.91 | 2.0 |
| Others | 2.1 | 3.75 | 1.1 |
| Total | 7.5 | 12.00 | 7.2 |
| <i>Urinary—</i> | | | |
| Parenchymatous nephritis | 2.3 | 1.96 | .. |
| Granular kidney | 5.4 | 3.46 | 1.7 |
| Others | 0.9 | 0.93 | 0.06 |
| Total | 8.6 | 6.35 | 1.76 |

| | | | |
|--------------------------------|------|------|-----|
| <i>Nervous—</i> | | | |
| Meningitis (non-tubercular) .. | 2.4 | 3.29 | 1.1 |
| Apoplexy .. | 6.2 | 1.96 | 2.9 |
| Others .. | 3.3 | 2.16 | 0.2 |
| <hr/> | | | |
| Total .. | 11.9 | 7.41 | 4.1 |

Enteritis, chiefly in children, shows 2.0 per mille in London against 1.42 in Calcutta, but this is largely due to the small number of children admitted to the latter hospitals, as the Calcutta vital statistics show that 4.1 per cent. of such deaths, even after omitting children under five, among whom they reached 6.1 per cent. of non-tropical diseases. Nevertheless, gastro-enteritis, apart from cholera and dysentery, is less common in Bengal than might have been expected in such a hot country with most defective hygiene and overcrowding, the explanation of which is doubtless the universal boiling of milk before use as an article of diet.

Cirrhosis of the liver remains to be discussed, and presents a most interesting and instructive subject. In a former analysis of 4,800 post-mortems, no less than 6.9 per cent. of cirrhosis cases were found, or seven times the rate in Germany, while the 1,600 Calcutta post-mortems show 5.91 per cent. after omission of the purely tropical diseases, as compared with 1.3 per cent. in the London records, or four and a half times as many in Bengal. This most remarkable difference cannot be explained on the still widely accepted alcoholic theory of its causation, so some other factor must be sought. This may possibly throw some light on the debatable point of its causation in Europe, where such an authority as Sir Humphry Rolleston considers that the rôle of alcohol has been over-estimated in the past, and that it acts as a predisposing cause of gastrointestinal catarrh, rather than as a direct exciting cause of cirrhosis, which it does not produce in animal experiments, while Sir Frederick Mott has pointed out that liver cirrhosis is not commonly met with in patients suffering from mental disease caused by chronic alcoholism.

Lieutenant-Colonel D. W. Sutherland, *r.c.s.*, has found the disease to be frequent among very strict Mahomedans in the Punjab, so there is no doubt that in India alcohol can be ruled out as a cause in a large proportion of the cases, for Mahomedans in Bengal only suffer slightly less from cirrhosis of the liver in proportion to their numbers than do the Hindus, while amebic abscess of the liver shows a very similar slightly lower rate in Mahomedans, although in this case alcohol is clearly not the exciting, but only a predisposing cause, in much the same way that some European authorities now regard it in the case of cirrhosis here. Moreover, cirrhosis was less common in proportion to their numbers in Europeans in Calcutta, although they generally take alcohol. The average age of the Calcutta cases of ordinary atrophic cirrhosis at death was 39.6 years, against 48 in Europe according to Rolleston, while Hindu males showed somewhat larger numbers than their normal proportion.

Of the 6.9 per cent. in the thirty-seven years' records 1.39 per cent. occurred in kala-azar, in which Sir Leonard described a special form of the disease excited by the presence of the Leishman-Donovan parasites in the endothelial lining of the hepatic capillaries, inducing what he has named an "intralobular" form of cirrhosis with delicate fibrous tissue bands throughout the liver lobule, producing a very hard, but smooth-surfaced organ, previously overlooked, but, in addition, many of the cases found complicating kala-azar are of the ordinary atrophic type. Secondly, we have a percentage of 0.12 due to "infantile cirrhosis of the liver" occurring in young children, apparently as the result of some dietetic or digestive errors. After deducting these

two varieties, although many of the kala-azar atrophic cirrhosis cases might fairly be included, there still remain 5.4 per cent. in the thirty-seven years' records, against 1.3 in the St. Mary's Hospital ones, or four times as many, in spite of the alcoholism being a very minor factor in its causation in Bengal, the reason for which requires careful consideration.

On tabulating all the complications of the cirrhosis cases, I found 25.6 per cent. of the fatal cases in which death was directly due to cirrhosis, and 30.1 per cent. of the latent cases, in which well-marked liver cirrhosis was found complicating other causes of death, dysentery had been present, usually in a chronic form or as scars of old dysenteric lesions. Granular kidney of some degree was also present in 13 per cent., the close relationship of these two diseases being well known, but no other complication was present in greater numbers in the cirrhosis cases than in the total cases. In 37.8 per cent. there was evidence of previous chronic gastrointestinal ulceration—after the omission of recent dysentery lesions—such as would be likely to result in long-continued absorption of toxic substances from the digestive system passing through the portal vessels to the liver. On the other hand, the percentage of the total cases, other than cirrhosis of the liver, showing chronic dysenteric lesions was only 8.86 per cent. or one-fourth as many as in the cirrhosis ones; so that it is likely that the causative factor in producing the great excess of cirrhosis cases in Bengal, in the absence of any material amount of alcoholism, must be toxic absorption through the portal circulation secondary to chronic forms of ulceration, nearly always of a dysenteric nature. Chronic forms of dysentery in the Calcutta post-mortems are mainly of the amebic type. Thus it is likely that the great frequency of cirrhosis of the liver in Bengal is antecedent chronic ulceration of the large bowel, usually of the amebic variety often of many years duration, and complicated by repeated attacks of hepatitis with great congestion of the liver due to the passage of the pathogenic ameba to the organ through the portal vein, which only occasionally goes on to liver abscess formation.

Urinary Diseases.

Kidney diseases are rather less frequent in Bengal with a rate of 6.35 per cent., against 8.6 per cent. in London, due to the slightly higher rate of 2.3 per cent. of parenchymatous nephritis in London to 1.96 in Calcutta, and the considerably greater number, 5.4 per cent., of granular kidney in England, against 3.46 in Bengal, which is easily accounted for on the age differences of the two series, as the disease increases in frequency with the duration of life in both countries, especially after 50 years of age. The remaining fatal urinary diseases of this medical series were few, and have a similar incidence in both areas.

Nervous Diseases.

Diseases of the nervous system show a greater preponderance in the English cases, due solely to the much larger number of cases of apoplexy, nearly all due to cerebral hemorrhage, in the London series with four times as many subjects over the age of 50 years, which fully explains the difference in the figures.

Meningitis of non-tubercular varieties, however, were more numerous in Calcutta, with 3.29 per cent., than in London with 2.4 per cent., and that, too, in spite of the far smaller numbers of children in the Bengal series, so this is a real difference in the two climates, and one which is explainable on the ground already mentioned in connection with other diseases, namely, the frequency of infections due to the streptococcal group of organisms in hot moist Bengal with great overcrowding in the houses, for in 18 of 1,000 post-mortems where meningitis was the primary cause of death, 11 were due to pneumococcus, 2 more to streptococci, and 5 were tubercular. The striking preponderance of the pneumococcal cases is of interest in relation to the remarkable frequency of lobar pneumonia and pericarditis due to

this organism already mentioned, while cerebro-spinal meningitis is not very rare in India.

Tumours, Innocent and Malignant.

During the last few years a somewhat vague theory has been put forward that cancer (including in that term the malignant connective tissue sarcomata) is essentially a disease of civilised races, and that the alleged immunity of uncivilised people is due to their diet consisting of "natural foods" containing abundant vitamins, which are said to be deficient in the diet of civilised races, much of whose food is preserved by artificial methods and otherwise rendered deficient in those substances. The main basis of this theory rests essentially on the statements of its advocates that cancer is very rare among the more uncivilised races.

In 1,600 Calcutta cases, the rate is 4.59, as compared with 13.8 in the St. Mary's Hospital records.

Malignant Growths in Calcutta and London Post-Mortems.

| Type. | No. | Calcutta Series. Rate per mille. | London Series. Rate per mille. |
|--|-----|--|--------------------------------------|
| Lymphosarcoma | 12 | 11.3 | 30 |
| Other sarcoma | 10 | 9.3 | 16 |
| CARCINOMATA— | | | |
| Stomach | 3 | 2.8 | 30 |
| Gall-bladder and ducts | 10 | 9.4 | 19 |
| Primary liver | 6 | 5.7 | 2 |
| Pancreas | 4 | 3.6 | 2 |
| Œsophagus | 0 | .. | 10 |
| Large bowel | 2 | 1.9 | 9 |
| Female genitals | 2 | 1.9 | 4 |
| Breast | 0 | .. | 5 |
| Others | 0 | .. | 13 |
| Total carcinomata | 27 | 25.4 | 94 |
| Total malignant tumours | 49 | 45.9 | 138 (ratio 1 to 3) |
| Ratio of cancers | .. | 1.0 | to 3.7 |
| Do. subjects over 40 | .. | 1.0 | to 2.7 |
| Do. do. over 50 | .. | 1.0 | to 4.8 |
| Per cent. London cancer cases over 40 years of age | .. | .. | 96.7 |
| Per cent. London cancer cases over 50 years of age | .. | .. | 76.0 |

Here, at first sight, we appear to have some confirmation of the alleged rarity of malignant tumours in the poor uncivilised races of India, who constitute the post-mortem subjects, but the very different age incidence of the Calcutta and London series necessitates corrections for that all-important factor. The London series show 4.8 times as many subjects over the age of 50 and 2.7 times as many over 40 years of age as the Calcutta series, while the total carcinomata are only 3.7 times as numerous as the Calcutta ones, although the London cancers showed 96.4 per cent. in persons over the age of 40, and 76 per cent. over 50 years of age. It is thus abundantly clear in the case of the carcinomata, the class of London malignant growths showing the greatest excess over the Calcutta figures, that the increase is fully explained by the several fold larger proportion of subjects of the cancer age in England as compared with Bengal; so we may conclude that these data, as far as they go, show no greater incidence of cancer in England than in India, when the age factor is taken into consideration.

An analysis of 1,190 tumours of which sections were cut in the pathological laboratory of the large Calcutta Medical College Hospital is given and the rates per mille of the principal forms of tumour are compared with those of 1,000 cases from the St. Mary's Hospital, London, pathological records.

The most striking fact is that in both series the malignant exceed the innocent tumours, and that the

percentage of malignant tumours is 57.9 in the Calcutta series, against 56.5 per cent. in the London one, the "uncivilised" races of India actually showing a higher proportion than the "civilised" people of England. The Calcutta percentage of sarcomata is 18.4 against only 9.1 per cent. in London, or one-half the Indian rate; while Calcutta showed 39.5 per cent. of epithelial malignant tumours against 47.4 in London, or five-sixths of the English figure, a difference easily accounted for by the 1921 Bengal census returns revealing only 17.86 per cent. of people over 40 years of age, against 27.53 in England, or only two-thirds of the British figure. The sarcomatous malignant tumours, with a much lower age incidence than carcinomata, are thus considerably more frequent in Bengal, while carcinomata are also relatively as frequent in Bengal in proportion to the population of the cancer age of over 40 years.

Incidence of the principal forms of innocent tumours.—Another striking feature is that the innocent connective tissue tumours form 24.45 per cent. of the whole in Calcutta, as compared with 14.7 per cent. in London, while, on the contrary, the innocent epithelial tumours numbered only 8.4 per cent. in India, against 15.8 per cent. in England, although the total number of innocent tumours were closely similar, namely, 42.1 per cent. in Calcutta to 43.5 per cent. in London. Thus, both innocent and malignant connective tissue tumours are commonest in India, while both classes of epithelial tumours preponderate in England, which supports the view of many pathologists with much experience of microscopical examinations of tumours, namely, that it is not by any means always easy to draw the line between simple and malignant growths, and that an innocent form may take on malignant characters at any time, simple connective tissue tumours becoming sarcomata and innocent epithelial ones carcinomata.

Incidence of the Commoner Tumours in Calcutta and London.

| INNOCENT TUMOURS. | 1,190 Calcutta | | 1,000 London | |
|------------------------------|----------------|---------------------------|---------------------------|--|
| | No. | Cases. Rate per mille. | Cases. Rate per mille. | |
| 1. CONNECTIVE TISSUE— | | | | |
| Fibroma | 75 | 63.0 | 29 | |
| Fibromyxoma | 63 | 52.9 | 10 | |
| Myoma | 118 | 99.1 | 55 | |
| Lipoma | 10 | 8.4 | 35 | |
| Chondroma | 8 | 6.7 | 3 | |
| Osteoma | 5 | 4.2 | 2 | |
| Vascular | 12 | 10.2 | 13 | |
| Total | 291 | 244.5 | 147 | |
| 2. CYSTS— | | | | |
| Ovarian and broad ligament | 61 | 51.3 | 56 | |
| Breast | 1 | 0.8 | 19 | |
| Thyroid | 3 | 2.5 | 14 | |
| Dermoid | 12 | 10.2 | 17 | |
| Hydatid | 2 | 1.7 | 2 | |
| Others | 31 | 26.0 | 22 | |
| Total | 110 | 92.5 | 130 | |
| 3. EPITHELIAL (a) PAPILLOMA— | | | | |
| Of skin | 24 | 20.2 | 29 | |
| Of mucous membranes | 16 | 13.4 | 36 | |
| Total papilloma | 40 | 33.6 | 65 | |
| EPITHELIAL (b) ADENOMA— | | | | |
| Breast | 38 | 31.9 | 23 | |
| Prostate | 5 | 4.2 | 27 | |
| Thyroid | 0 | 00.0 | 37 | |
| Others | 17 | 14.3 | 6 | |
| Total adenoma | 60 | 50.4 | 93 | |

Incidence of the Commoner Tumours in Calcutta and London.—Concl'd.

| INNOCENT TUMOURS. | No. | 1,190 Calcutta Cases. Rate per mille. | 1,000 London Cases. Rate per mille. |
|----------------------------------|-----|--|--|
| Total epithelial .. | 100 | 84.0 | 158 |
| Total innocent tumours .. | 501 | 421.0 | 435 |
| Malignant tumours —sarcomata .. | 219 | 184.0 | 91 |
| Squamous e p i- thelial .. | 240 | 201.6 | 208 |
| Carcinomata .. | 230 | 193.2 | 266 |
| Total malignant epithelial .. | 470 | 394.8 | 474 |
| Total all malig- nant tumours | 689 | 579.0 | 565 |

The innocent connective tissue tumours show a fairly general higher rate in the Indian figures, with the exception of fatty tumours, which are more numerous in the London series, probably due to this form of growth being practically harmless except for the disfigurement caused by them, resulting in the civilised race more frequently troubling to have them removed. On the other hand, about one-third of the total excess of the Calcutta figures in this group is due to the excess of myomatous tumours, 107 of 118 Calcutta, and 49 of 55 London ones having been tumours of the uterus, and the higher incidence in Calcutta is probably partly due to the special hospital for gynaecological and obstetric cases of the Calcutta Medical College Hospital having more beds than those of the St. Mary's Hospital wards for diseases of women, allowing of more numerous operations for this class of tumour. Nearly two-thirds of the Calcutta excess of simple connective tissue tumours, however, is due to the fibroma and fibromyxoma, for which there is no obvious explanation, while chondroma and osteoma were also slightly in excess in the tropical area; so we may conclude that the excess of this class of tumour as a whole in Calcutta is a genuine one.

The innocent epithelial tumours, were nearly twice as numerous in the London as in the Calcutta series, the excess being nearly equally marked in the two main classes of papillomata and adenomata. The adenomata were also nearly twice as frequent in the London series, but here the excess is solely due to 37 thyroid and 27 prostatic tumours, against 0 and 5 respectively in the Calcutta series; the thyroid excess, again being due to more frequent operations for this condition in London, doubtless often on account of disfigurement, which does not cause the coolie class in Bengal to desire or submit to operations for their common thyroid enlargements; while enlargement of the prostate is far rarer in the tropical area on account of the very much smaller percentage of elderly people liable to enlargement of this organ in Bengal. Adenomata of the breast numbered 31.9 per mille in Bengal against 23 in London, which is rather surprising in view of the great excess of cancers of this gland in London, although, if the cysts are added to the adenomata, the combined rate per mille London figure of 42 is in excess of the Calcutta one of 32.7, so that the total innocent tumour rate, including the cystic ones, of the breast is higher in the English series.

The sarcomata were met with twice as frequently in the Calcutta as in the London series, the excess which appears to be only partly accounted for by the larger proportion of persons of the younger decades in Bengal, for this class of malignant growth is met with at all ages. The very malignant small round-celled sarcoma greatly preponderates in the Calcutta series, the rate per mille being 110 against only 23 in the London series, while the proportion of the other varieties differs but little in the two series, although the melanotic form is also more common in the dark-skinned tropical race.

Incidence of Malignant Tumours in Calcutta and London.

| | No. | 1,190 Calcutta Cases. Rate per mille. | 1,000 London Cases. Rate per mille. |
|----------------------------------|-----|--|--|
| 1. SARCOMATA— | | | |
| Round celled. .. | 131 | 110.0 | 23 |
| Spindle celled .. | 47 | 39.5 | 40 |
| Polymorphic .. | 14 | 11.8 | 9 |
| Chondrosarcoma .. | 5 | 4.2 | 4 |
| Osteosarcoma .. | 2 | 1.7 | .. |
| Melanotic .. | 10 | 8.4 | 4 |
| Lymphosarcoma .. | 10 | 8.4 | 11 |
| Total .. | 219 | 184.0 | 91 |
| 2. EPITHELIAL (a) SQUAMOUS— | | | |
| Skin .. | 61 | 50.8 | 35 |
| Lips .. | 10 | 8.4 | 11 |
| Cheek .. | 12 | 10.2 | 8 |
| Tongue and floor of mouth .. | 23 | 19.3 | 60 |
| Jaw .. | 22 | 18.5 | 9 |
| Throat and larynx .. | 4 | 3.6 | 20 |
| Œsophagus .. | 4 | 3.6 | 8 |
| Penis .. | 18 | 15.1 | 7 |
| Vulva and vagina .. | 6 | 5.0 | 4 |
| Cervix uteri .. | 80 | 67.2 | 18 |
| Secondary in glands .. | .. | .. | 28 |
| Total .. | 240 | 201.6 | 208 |
| EPITHELIAL (b) GLANDULAR— | | | |
| Breast .. | 81 | 68.0 | 152 |
| Uterus .. | 54 | 45.4 | 17 |
| Ovary .. | 28 | 23.5 | 12 |
| Stomach .. | 5 | 4.2 | 11 |
| Liver primary .. | 9 | 7.7 | .. |
| Gall-bladder .. | 6 | 5.4 | 3 |
| Large intestine .. | 9 | 7.6 | 33 |
| Abdominal .. | 6 | 5.1 | 7 |
| Kidney and supra- renal .. | 2 | 1.7 | 5 |
| Prostate and testicle .. | 5 | 4.2 | 5 |
| Others .. | 25 | 21.0 | 21 |
| Total .. | 230 | 193.4 | 266 |
| Total malignant epithelial .. | 470 | 395.0 | 474 |
| Total malignant all forms .. | 689 | 579.0 | 565 |

The malignant epithelial tumours or true cancers are nearly equally divided in both series between squamous and glandular epithelial forms, although the location of both classes differs widely in the two areas dealt with. There is little difference in the total number of the squamous-celled variety between the two series, but the glandular epithelial type shows a considerable excess in the London as compared with the Calcutta series, which is in accordance with the larger number of cancers in the London post-mortem data already dealt with, for nearly all the cancers met with in hospital post-mortems belong to the internal glandular carcinomata, which are far less easily diagnosed than surface tumours, and are thus less likely to be recognised in uncivilised races, with comparatively few well-qualified experienced medical men, in the absence of accurate post-mortem records and microscopical examinations, such as form the basis of my observations.

Distribution in the body of squamous epitheliomata.—Malignant growths of the skin are actually far more prevalent in the Calcutta than in the London series, namely, 50.8 per mille in the former, against 35 in the latter, and that, too, although the well-known Kangri burn epithelioma of the thighs and abdomen of Kashmir, due to carrying charcoal burners under the clothes in

that cold mountainous area, were not met with in Calcutta. This great prevalence of skin cancers in tropical Bengal appears to be associated with the common chronic forms of ulceration of the skin there seen, indicating that when chronic irritation is present, there will cancer be prevalent, as is so well illustrated by *Kangri* burn cancer itself, which E. F. Neve has recently reported affects principally the older men, the average age of onset being 55 years. In view of the considerably smaller proportion of the population of Bengal of the cancerous age, this excess of surface epithelial cancers is all the more striking and significant. Epithelioma of the lip was rather more common in the London series, namely, 11 per mille to 8.4 in Calcutta, while Calcutta shows 10.2 per mille cancers of the cheek against 8 per mille in London, the well-known form due to the irritation produced by chewing pan containing both lime and betel nut, being less frequently seen in Bengal than in Ceylon, for R. L. Spittel recently reported that he operated on about fifty a year in the Colombo General Hospital, although he is only one of three surgeons on the staff—once more illustrating that chronic irritation is at least as effective in originating squamous epitheliomata in the Eastern tropics as among civilised races of Europe and Northern America.

Cancer of the tongue and floor of the mouth was just over three times as frequent in London as in Calcutta, namely, 60, against 19.3 per mille, in striking contrast to that of the skin, the probable explanation of which is worth looking into. The three main recognised exciting or predisposing causes of this condition are syphilis, smoking, and the irritation of fragments of decayed teeth; but syphilis is at least as frequent, and probably more so, among the hospital class of patients in Bengal as in England, as judged by recent Wassermann tests carried out in the Serological Laboratory at the Calcutta School of Tropical Medicine, while smoking is also a frequent habit, although in excess it is probably less common in the tropical area, so these two factors taken together furnish no explanation of the great excess of cancer of the tongue in England. When we turn to the dental condition we find a very different state of affairs, for decayed and broken teeth are far more frequently seen in England than in Bengal; examinations of candidates of both races at the India Office during the last two years having shown me that a perfect set of teeth is as common in Indians as it is rare in Europeans of about the same ages. So here once more we find the explanation of the differences in cancer distribution in the two series of figures in chronic irritation being the most important factor in producing cancer, the frequency with which cancer of the tongue begins at the edge in contact with broken teeth being very significant.

Epithelioma involving the jaws were much more common in the Indian series, namely, 19.3 per mille against 9, which is probably associated with the great frequency of chronic pyorrhœa in the natives of Bengal, producing chronic irritation of the alveolar region; while cancer of the throat and larynx showed the reverse incidence with 4 in the Calcutta to 20 in the English series, which is much greater than is explainable by the age factor, and may possibly be related to excessive smoking irritating the delicate mucous membrane of the throat, or to innocent epithelial tumours of mucous membranes being more frequent in England. The œsophagus is also more affected by cancer in England than in Bengal, both in the tumour and in the post-mortem series, no such cases having been met with in the Calcutta post-mortems against 10 per mille in the London series.

Epithelioma of the penis shows more than twice as high a rate, 15.1 per mille in Calcutta, as in England with 7 per mille, and this is well known to surgeons in India and Ceylon. R. L. Spittel at the Colombo Hospital having operated on no less than 91 such cases within four years, and he, rightly in my opinion, attributes this great excess to the accumulation of smegma beneath a congenital phimosis, as he had never seen the

disease in circumcised races—yet, again, illustrating the importance of chronic irritation. On the other hand, epithelioma of the vulva and vagina were nearly equal, although those of the vulva were 4.2 in Calcutta to 1 per mille in London, while the figures of those of the vagina were reversed, namely, 0.8 to 3 per mille, but the numbers are too small to be of much significance. The London series included 28 per mille of secondary squamous epithelioma in glands, against none in Calcutta, although these were only included when not removed at the same time or nearly so as the main growth, indicating that in Calcutta patients seldom returned for such secondary recurrences, but for the inclusion of which the rate per mille of squamous epitheliomata would have been actually higher in the Bengal than in the English series, instead of very slightly less. We may therefore conclude that there is no difference in the incidence of this class of tumours in "uncivilised" Bengal people and in "civilised" Europeans in England, except that, when the age factor is allowed for, squamous-celled cancers are much more common in the Bengal race.

Distribution of glandular carcinomata.—This last class of malignant tumours shows rather larger numbers in the London series, although the distribution of various forms shows remarkable differences, which are of considerable interest.

Breast cancers numbered 152 per mille in London, against only 81 per mille in Calcutta; a remarkable difference which has been observed in other tropical countries. Fibro-adenoma of this gland is more frequent in the Calcutta series, but, if innocent cystic tumours are added, the number of non-malignant tumours is nearly equal in the two series; so the preponderance of cancers of the breast in England cannot be attributed to the frequency of innocent tumours becoming malignant, while it is doubtful if it can be fully accounted for by the age factor, so some other cause must be sought. It has been suggested that the custom of tight-lacing and wearing firm corsets in "civilised" races, now happily on the decrease in Western Europe, is an important exciting or predisposing factor in the production of breast cancer, and the complete absence of that habit among the little affected Indian women lends support to that view, so it is to be hoped that the more rational and hygienic fashions of the present moment may persist long enough to allow of its possible good effect on the incidence of this too common affliction to be thoroughly tested. As cancer of the breast is said to be common in unmarried women and in those who do not suckle their children, the rarity of such in India may also be a factor.

Cancers of the uterine and ovaries show extraordinary high rates in Bengal as compared with London, which is all the more remarkable when the age factor is taken into consideration. Thus, malignant growths of the ovaries were 23.5 per mille to 12 in London, or almost twice as many; cancer of the body of the uterus showed 45.4 against only 17 in London, or nearly three times as many, while that of the cervix uteri were 67.2 against only 18 per mille in the English series, or over three and a half times as high an incidence. A part of this very great excess in Calcutta must be attributed to the larger number of gynaecological beds in Calcutta Medical College Hospital as compared with St. Mary's Hospital in London, but after making allowance for that factor a great excess still remains, and that, too, although the age factor balances the hospital accommodation one, so the excess must be regarded as a real one requiring explanation, while its occurrence is also vouched for by Lieutenant-Colonel C. H. Leicester, I.M.S., now superintendent of the Women's Hospital of the Calcutta Medical College, and the reason must be sought for in the very different conditions of the child-bearing period in the two races. In the first place, the menstrual periods come on considerably earlier in Indian than in English girls, and still more important is the remarkably early age of marriage in India, where it is considered a religious crime for menstruation to take

place before marriage and co-habitation, so that active sexual life of females often begins at about 12 years of age, instead of probably over twenty on the average in England. Further, the climacteric, with involutionary changes in the genital organs predisposing to cancer development, is also considerably earlier in Bengalis than in Europeans in a temperate climate. Moreover, the age tables in Hoffman's valuable statistical work on "The mortality from cancer throughout the world" show that the cancer rate of the female generative organs rises greatly between 35 and 44 years of age, and still more rapidly in the following decade, especially in the cervical form which so greatly preponderates in Bengal, although that of the skin and large bowel shows no great rise until 55 to 65 in the United States; so that if cancer commonly occurs in India we might expect it to be clearly evident in the case of cancer of the uterus, as is actually the case, only much more so than the age factor alone will explain. We may therefore conclude that early marriage and the early ending of the child-bearing period of females in Bengal are important factors in the very high cancer incidence on the uterus and cervix; so that where the conditions are thus favourable this disease, so far from being only one-eighth as frequent as in European and North American races as Hoffman maintains, cancer is actually far more common in the "uncivilised" Indian race, even in spite of the age factor being so unfavourable to cancer in Bengal.

Cancer of the gastro-intestinal canal.—Here we meet with just the opposite position to the case of uterine cancers, for both gastric and intestinal cancer is much more common in the London than in the Calcutta series, as shown both by the post-mortem and the microscopical examinations of material from the hospitals, which are complementary, as the post-mortem data reveal the frequency of inoperable internal cancers, and the pathological laboratory reports those for the removal of which operations are commonly undertaken. Thus, gastric cancers formed 30 per mille of the St. Mary's Hospital post-mortems, against only 2.5 in the Calcutta autopsies, while in the microscopical reports the former showed 11 per mille against 5 per mille in Bengal, or not more than the age factor would account for. On the other hand, in the case of cancer of the large bowel the pathological reports showed 33 per mille in London, against only 7.6 in the Indian series, while the autopsy records gave 9 in London to 2 in Calcutta, and even this excess is below the true figure, for large bowel cancers were met with more frequently in the surgical post-mortems at St. Mary's than at Calcutta, which are not included in the analysis, and the same applies to oesophageal and, to a less extent, to gastric cancers, operations, other than for the relief of intestinal obstruction, having been more frequently performed in the London Hospital. These data fully confirm a very strong impression that cancer of the large bowel is a rare disease in Bengal as compared with England, the differences being considerably greater than can be explained by the age factor, in spite of the fact that no less than 23 of the 29 London gastric cancers of which the age was recorded were over 50, at which period the London autopsy series showed four times as many subjects as the Calcutta one.

This comparative rarity of gastro-intestinal cancer in "uncivilised" tropical races has been attributed by Sir Arbuthnot Lane to intestinal toxæmia secondary to constipation in "civilised" races. Some writers on cancer state that constipated stools are practically unknown in races living under primitive conditions on simple natural foods as in Bengal, but this is not correct, as Sir Leonard has met with constipated stools in Indian subjects post-mortem many scores of times in Calcutta. On the other hand, it is fact that such people, as a rule, pass soft unformed stools, and this is probably the most important cause of their relative immunity to cancer of the large bowel, but this is probably another example of the general rule that some form of chronic irritation is the most frequent precedent of cancer, and there

is no reason to attribute cancer here or elsewhere in the body to "intestinal toxæmia." With one noteworthy exception, the remaining forms of cancer, namely, those of the kidney and suprarenals, of the prostate and testicle and other miscellaneous varieties furnish very similar figures in the two countries dealt with, so that when the age factor is taken into account they are rather more prevalent among the vitamine-consuming more primitive Indian race. There only remain for consideration cancers of the liver and gall-bladder, which are of altogether exceptional interest, for the pathological laboratory data show 7.7 per mille of primary liver cancers and 5.4 per mille of cancers of the gall-bladder and ducts in the Calcutta series, against 0 and 3 per mille respectively in the London series—a most remarkable excess in the Bengali race, even without allowing for the age factor. In the post-mortem series Calcutta shows 5.7 per mille of primary cancer of the liver, against 2 per mille in London, while gall-bladder cancers numbered 9.4 per mille in Calcutta against 19 in London, the lower Bengal rate being more than explained by the age factor, for Sir Leonard finds that 14 out of 17 gall-bladder and duct cancers in the London post-mortems of which the ages are recorded were over 50 years of age, and all 17 were over 45.

Sir Leonard pointed out in his earlier paper that his data proved that the Indian hospital subjects, nearly all of the poorer coolie working class, showed the same feature that is well known in civilised races in Europe, namely, that gall-stones are considerably higher in each decade after the first, in females than in males, which is of interest in connection with the old European theory that this is due to females being addicted to tight-lacing and sedentary habits, neither of which are failings of the Indian coolie woman; another good example of the light that such a study as the present one may throw on questions of interest in European medicine.

Percentages of Gall-Stones in Calcutta and London.

| Ages. | 4,544 Calcutta post-mortems. | | | | 1,200 London post-mortems. | | | |
|----------|---------------------------------|-------|--------|------|-------------------------------|--------|-------|-------|
| | Hindus. | Mahs. | Males. | Fem. | Total. | Males. | Fem. | Total |
| 0 to 20 | 1.3 | 0.72 | 1.5 | 3.4 | 1.94 | 0.00 | 0.00 | 0.00 |
| 21 to 30 | 3.7 | 1.24 | 2.6 | 4.8 | 3.2 | 1.60 | 1.92 | 1.60 |
| 31 to 40 | 5.1 | 4.4 | 4.7 | 9.8 | 5.7 | 3.00 | 5.00 | 3.75 |
| 41 to 50 | 6.6 | 5.73 | 5.0 | 18.8 | 7.6 | 5.38 | 9.23 | 6.66 |
| 51 to 60 | 9.0 | 8.33 | 7.8 | 12.3 | 9.9 | 7.19 | 19.70 | 10.73 |
| Over 60 | 18.5 | 17.5 | 15.7 | .. | 22.2 | 12.71 | 28.60 | 18.23 |
| 61 to 70 | .. | .. | .. | .. | .. | 9.20 | 28.95 | 15.20 |
| Over 70 | .. | .. | .. | .. | .. | 22.50 | 28.00 | 25.00 |

Of much greater importance is the question of the incidence of gall-stones in India and in England in relation to the relative prevalence of cancer of the gall-bladder, and perhaps also of the liver, for it has been abundantly proved that gall-stones do excite the formation of cancer of this organ, while Dr. Leitch has demonstrated this experimentally in animals, so that we have here a crucial test as to whether the "uncivilised" races of India, living under primitive conditions on simple natural foods, are practically immune to cancer, as Hoffman and others claim when a cause is present which is known to excite the formation of cancer in the civilised races of Europe and North America living so largely on artificially prepared foods deprived of vitamins? The answer to this question is plainly written in the figures, for it will be seen that in every decade, from the second to the fifth, as well as in those over 60 years of age, gall-stones were more frequently met with in the Bengali race than in the English; while cancer of the gall-bladder is more common in the former than in the latter, especially in view of the much smaller proportion of the Bengalis living to the cancerous age. The disease is also relatively more frequent in females in proportion to their numbers in the hospitals than in males, and the pretty theory that vitamine-containing natural foods of "uncivilised" races protects from cancer once more completely breaks down when submitted to the practical test of carefully recorded and extensive pathological data.

Another point of especial interest is the frequency of the development of cancer in those who have gall-stones at different age periods.

Frequency of Cancer in Gall-Stone Cases at Different Age Periods.

| AGES. | Gall-stone cases. | | Gall-bladder or Duct Cancers. | |
|----------|-------------------|-----------|-------------------------------|-----------|
| | No. | Per cent. | No. | Per cent. |
| Up to 30 | .. 2 | 0.5 | 0 | 0.0 |
| 31 to 45 | .. 12 | 4.6 | 0 | 0.0 |
| 46 to 50 | .. 9 | 6.0 | 3 | 33.3 |
| 51 to 60 | .. 25 | 10.7 | 2 | 8.0 |
| 61 to 70 | .. 19 | 15.2 | 2 | 10.5 |
| Over 70 | .. 14 | 25.0 | 3 | 21.4 |

These data show that no cases of cancer of the biliary system arose before the age of 46, although gall-stones were common between 30 and 45; yet between 46 and 50 no less than one-third of the gall-stone cases developed cancer, although between 51 and 60 only 8 per cent. of such cases were complicated by malignant growths, and this proportion increased gradually in later decades, although not to as high a point as was reached between 46 and 50. 96.4 per cent. of all cancers in the London series, from which the above figures are taken, arose after the age of 40, mostly those of the fifth decade occurring in its second half; so that the sudden great rise in the gall-bladder and duct cancers, as soon as the age of 45 is passed, indicates strongly that it is only after that age that gall-stone irritation readily induces cancer formation in man, although most of the subjects had gall-stones during the previous decade. The advisability of removing gall-stones without delay in patients reaching the cancer age of 45 is therefore obvious. The data also lend striking support to the view that any increase in cancer during the last sixty years in Great Britain is mainly, if not entirely, due to the increase of about two decades in the average duration of life here during that period, as the result of great sanitary advances; being thus a penalty of increased longevity, requiring no theory of cancer being due to increased consumption of artificial foods to account for it.

The whole of the foregoing analysis of the incidence of malignant tumours in Bengal, therefore, may be summed up in the single sentence: Where the exciting cause is present, there will cancer result in primitive tropical people of the cancerous age at least as readily, if not more so, than in the civilised races of temperate climates.

Conclusions Regarding the Incidence of Tumours in Bengal and England.

1. Malignant tumours, including both connective tissue and epithelial types, are about equally common in Bengal and England, with a slight excess in the tropical country, quite contrary to the statements of those who maintain that civilised races suffer eight times as much from them as uncivilised primitive peoples.

2. Both innocent and malignant connective tissue tumours are considerably more common in Bengal than in England, while the reverse is the case with both innocent and malignant epithelial tumours; which supports the view that the innocent forms shade off into or may take on the characters of malignant ones.

3. The slightly lower incidence in Bengal of the malignant epithelial tumours or carcinomata is fully explained by the age factor, as the higher rate in London is more than accounted for by the great excess of persons of the cancer age of over 40 or 50 years in England as compared with Bengal.

4. Cancers of the tongue, œsophagus, stomach, large intestine, and breast show considerable excess in the London pathological examinations, while those of the skin, penis, both the cervix and body of the uterus, liver, and gall-bladder are in excess in India, nearly all of which are explainable on the known laws of long-continued irritation being the most important predisposing

or exciting cause of cancer. This relationship is strikingly illustrated by the figures given, showing that gall-stones and cancer of the gall-bladder are rather more common in Bengal than in London, for it has been proved experimentally that the presence of gall-stones may induce cancer formation in this viscus.

5. The three-fold excess of cancer of the uterus in Bengal is probably related to early menstruation, child-bearing, and menopause in the Bengali race leading to earlier and more frequent development of cancer in them as compared with European females.

6. In future, the onus will lie on those who proclaim the rarity of malignant growths in uncivilised races of proving their assertions by extensive and accurate pathological data, such as those on which the above conclusions are based, for about 90 per cent. of the Bengal population, who furnish a large proportion of the Calcutta hospital cases, live in villages under primitive conditions, and on a diet of natural foods.

THE CANCER PROBLEM.

By H. HALLILAY,

LIEUTENANT-COLONEL, I.M.S.,

Civil Surgeon, Simla.

Now that a full account of the research undertaken by Dr. W. E. Gye and Mr. J. E. Barnard on the "Ætiology of Malignant New Growths" is available, it is apparent that the cabled summaries of the results of the investigation which were published a few weeks ago if anything but underestimated their importance.

The *Lancet* in a long and thoughtfully written leading article hails the publication of this paper as a step towards the solution of the cancer problem.

By this mail we have received an endorsement of these results in an article specially written for the *British Medical Journal* by Dr. Archibald Leitch, whose high reputation as an original worker at the cancer problem and whose position as Head of the Cancer Research Institute at the Chelsea Cancer Hospital render him peculiarly fitted to express an opinion upon these the conclusions arrived at by the authors of this joint research.

There appears to be no doubt whatever that a real advance has been achieved towards the solution of the cancer problem. Continuing on the line of research which was started by Peyton Rous and abandoned by him 13 years ago, the authors have shown that not only is it possible to transmit the sarcoma with which he worked from chicken to chicken, by means of a cell-free filtrate, but that it is possible to reproduce the sarcoma in fowls by means of subcultures from the same cell-free filtrate down to the fifth subculture. Since the fifth subculture would entail a dilution of the original agent of a thousand billion times it is difficult to avoid the inference that growth of the original virus has taken place in the subcultures, because even in such low dilutions as 1/10th or 1/100th of the original cell-free filtrate in saline no growth follows inoculation.

They have shown, a very momentous and significant fact, that the cell-free filtrate contains two factors, and that in the absence of either factor no growth of the sarcoma will take place.

For instance it has been found possible to free the filtrate of all adherent material by washing in saline, and this washed filtrate does not produce any tumour when injected. It has further been found possible to render the virus in the cell-free filtrate innocuous by treatment with chloroform; this sterilised virus does not produce a tumour when inoculated. Injected together in sufficient quantity the combined factors invariably result in tumour formation.

In other words before this virus can implant itself in a living cell whether of man or animal, the presence of this factor, named by Dr. Gye the "specific factor" is essential. The "specific substance" is obtained or produced from the cells themselves presumably as the result of chronic irritation.

Oct., 1925.]

Though the virus itself is "ultra-microscopic" Mr. Barnard has been able to demonstrate it and even to take micro-photographs of it, by means of the special appliances which he has devised.

In short the authors are to be congratulated on the completion of a most brilliant and epoch-making piece of research, which not only brings us appreciably nearer to the solution of the cancer problem, but has opened up immense possibilities in many other fields of pathology.

Current Topics.

The Trend of Modern Hygiene.

By ANDREW BALFOUR.

Lancet, May 9, 1925, p. 1008.

Extracts from a paper read before the Royal Society of Arts on April 29th, 1925.

OF late years such a remarkable and far-reaching change has come over, both, the spirit of our dreams and our actual undertakings that we may, with some justice, assert that a new hygiene has been developed, a modern health campaign possessing features which entitle it to be classed as a distinct entity.

The most important item in the public health campaign is, beyond all doubt, education; not so much education of the medical student, the medical man, the dental surgeon, the veterinarian, or the sanitary inspector, as education of the lay public.

Dr. John Dill Robertson, of Chicago, does not hesitate to charge the general practitioner with criminal negligence, hoping that his message will prove so irritating that it will stimulate him to a sense of his responsibilities as a guardian of the public health in his own special direction. According to Robertson, who, of course, merely voices in rather a strident tone the views of others, the true function of the private practitioner is not to cure the sick, but so to advise his patients, or rather, his clients, that they will remain in good health. Away back in 1907 the same argument was advanced as forcibly by Dr. John McVail in a memorandum accompanying his report on Poor-law Medical Relief in England and Wales. In a recent address he developed his theme and indicated seven directions in which the family physician might be of service as a valuable ally of the medical officer of health.

He deals with the doctor as a historian, an inquirer into family history, and as an observer and checker of tendencies towards general disease. Let it be noted that amongst the diseases mentioned figure obesity and alcoholism. He envisages the physician as a health guardian of the child, a watchful attendant both of mind and body, a corrector and remover of defects, an adviser to the parents. He traces the extension of this medical care to the youth and the maiden, when the practitioner should guide as to work and athletics and be upon the qui vive to remedy faulty tendencies of all kinds at the threshold of adult life. He pictures him as the friend and confidant of the woman, saving her from the special troubles besetting her sex, and watching the adult man, to see that he does not develop some trade disease, strain his heart, or damage his respiratory organs. In addition, he speaks of general examinations like those for which Dr. Robertson pleads, and he figures the doctor as a prop for old age, trying to ward off apoplexy and stay the morbid processes which too often make the evening of life a tragic misery. Dr. McVail is careful to point out that the doctor can only assume such a rôle with the consent of the individual—the adult for himself, the parent for the children.

Now while, presumably, the majority of medical men at the present time could be trusted to give a sound

opinion on the middle-aged golfer, it is by no means so certain that they could adequately fulfil the duties listed by Dr. McVail. They have been reared, he it is remembered, in an atmosphere of curative medicine, and they have not been trained to look for the beginnings of disease. Of course, amongst them there may be a few James Mackenzies with the seeing eye and the understanding heart, but, taken as a whole, the general practitioner is a patcher, not a preventer. That is not his fault. In the past his training has been defective.

For one thing, he has struggled through a series of more or less water-tight compartments. There has been little linking up of his early scientific knowledge with his later medical and surgical studies, and, if he is to act effectively, his medicine and surgery must be leavened with a leaven wherein physics, chemistry, biology, anatomy, and physiology are combined as ingredients, together with sympathy and common-sense. For another, the doctor, as a student, has been so crammed that too often one mass of ill-digested facts has, throughout the curriculum, crowded out another in process of assimilation, and the only wonder is that he has emerged sane and sound and with a modicum of useful knowledge. For yet another, the preventive aspects of his life's work have not been explained to him, and the vast possibilities which lie before him are too often as a sealed book.

Now all this is changing. The beginnings of that change are recounted in the masterly treatise by our distinguished chairman, his memorandum entitled "Recent Advances in Medical Education in England," or, as he might have written, "Great Britain," for he cites Scotland again and again, and the old Alma Mater which I had the honour to share with him. Sir George Newman and others have remembered what happens when the blind have blind leaders and by degrees a new type of doctors should be evolved, who, it is to be hoped, will combine the acumen of the old clinical observer with the broad outlook of the sane scientist.

One of the most significant happenings in the modern health campaign is the attention paid, not only to dietetics, but to food preservatives and to the handling of food-stuffs. The layman, I fear, must be a little bewildered by all that is said and written about diet. Screen succeeds screen on vitamins. Here an authority thunders against butchers' meat and starchy foods, there an oracle condemns milk for adults. We read of human cesspools. We are told that our faulty food habits explain the increase of cancer. At times one wonders how the human race has managed to survive at all and exclaims with Pontius Pilate, "What is Truth?" And yet we are progressing, for we are beginning to understand the relation of diet to endocrine secretion and we are correcting errors into which we have drifted through non-adaptation to our complex surroundings, through failure to understand that what the primitive man can do with impunity the civilised man, or at least the town-dweller, does at his peril. The truth really lies in moderation, for, in a phrase I once coined and which perhaps will bear repetition, it is still the case that many folk by their copious libations 'wash themselves into graves which may have been dug with their own teeth.' Copious libations do not signify wholly, or even mainly, the imbibition of alcoholic beverages, for a vast deal of digestive trouble is brought about by excess in tea and coffee drinking, and by the swelling of liquid, frequently in effervescing form, during meals. Most of us after middle-age eat far more than we require. War experience should have taught us a salutary lesson, but, like other lessons, it has been forgotten.

I am inclined to think that eventually the chief value of the scientific tirade on foods and feeding will be found to lie in the fact that it will teach some sections of the most important class of the community—the workers—how to live cheaply as well as healthily, how to get the best food value for money spent. This in itself is a great matter, for the waste at present is enormous. Remember, however, there are many poor

housewives who, on the practical side could give the scientist points.

The conditions in a country like India are such that I sometimes think it would be well if the practice of hygiene there and in some other lands assumed the aspect of religious exercises. There are many forms of worship inferior to that of the goddess Hygeia, and if only the devotions could be adapted to the mentality and habits of the people, I believe more benefit would accrue than from all the efforts now made.

In Africa the case is rather different, and at the present time a great effort is being made to educate the African along sound lines. The trend is towards creating native hygienists who will be able to aid in the sanitary salvation of the Dark Continent. I have no doubt, from what I have seen, that this is capable of accomplishment, though it will take time and money. What the Americans call "visual education" is badly needed, and whether this be accomplished by the cinematograph, by diagrams and models in the schools, or by the establishment of graphic museums, care should be taken that it is not neglected in any scheme for native training.

The Future.

Lastly, both at home and abroad, stress should be laid on the financial aspect of public health work, and the ultimate aim of the hygienist should be clearly and definitely stated. The monetary value of sanitary endeavour is a very tangible thing, and statistics are now available regarding many lines of health work, which are most impressive and should convince all save the cranks and the wilfully ignorant. Thus, taking industry, which is so closely related to finance, we know, beyond all manner of doubt, that attention to mental hygiene in factories and workshops promotes harmony and leads directly to a larger output.

A hopeful sign is that there is much enthusiasm and no little idealism in public health circles, and, so long as these are well regulated, they cannot fail of their effect. Yet it is wise to bear ever in mind the dictum of Ricci and the wisdom of Adam Smith. Ricci wrote: "The prudent man may direct a state, but it is the enthusiast who regenerates it or ruins;" while Adam Smith, in his "Wealth of Nations," before the dawn of the so-called scientific era, declared: "Science is the great antidote to the poison of enthusiasm and superstition."

The Specific Action of Drugs in Tuberculosis.

By W. E. DIXON, M.D., F.R.S.

British Med. Jl., May 2, 1925, p. 813.

It is now well recognised that a patient suffering from tuberculosis, who is placed under the charge of a doctor will, for a time at least, improve in health no matter what drugs, vaccines, or speciality of treatment may be employed. The beneficial result is due in this as in other diseases, to efficient nursing, to the regulation of food, exercise, and sleep, and to light and fresh air.

General hygienic measures are of primary importance in treatment, and it is not until all the beneficial effects, which we know will ensue from these alone, have been exhausted that we have any right to ascribe an effect, beneficent or otherwise, to a special treatment.

Drugs are employed in tuberculosis either with the object of attacking and preventing the growth of the tubercle bacillus or other organisms with which the disease may be associated, or of neutralizing poisonous toxins, or of removing or relieving symptoms. It is with the first group that Dr. Dixon deals in this address.

The ideal for which we search is an internal antiseptic something which will prevent the growth of the tubercle bacillus without injuring the host, and this principle of internal antiseptics has now come to be termed "chemotherapy."

The ordinary common antiseptics, like phenol and the coal-tar derivatives (creosol, guaiacol)—mercury perchloride and formalin, destroy the animal before they destroy bacteria.

If the coal-tar derivatives (cinnamic acid, creosote, guaiacol, and the rest) exert a beneficial action on tuberculous patients, the explanation is not that they influence directly the tubercle bacillus. The same is, of course, true of formic aldehyde, at one time much in vogue as a vapour for inhalation by phthisical patients. Formic aldehyde in the body at once combines with proteins and loses all antiseptic action.

Essential-oils, like oil of cinnamon and oil of garlic, fail in the hands of the sceptical physician. Fischer showed that menthol-eucalyptol injections into tuberculous rabbits in no way altered the course of the disease.

Calcium.

Maendl treated 250 patients with intravenous injections of 5 c.c. 10-per cent. calcium chloride every day or second day. The injections were given on alternate weeks, and each patient received twenty injections. All the symptoms were influenced favourably. Calcium deficiency is a well-known condition of many diseases, including tuberculosis, and calcium injections may influence favourably the condition by limiting inflammatory exudation, but they do not influence the cause of the condition.

Silica has not been proved to be of any value.

Arsenic.

Inhalation of arsenic has been described as effecting cures by Chavant. On the other hand, careful experiments made with the likely organic arsenic derivatives such as arsphenamine and its silver compounds show that they have no favourable influence on the disease.

Chemotherapeutic agents have a specific selective action on certain tissues and bacteria, probably physical rather than chemical, and, unlike the group we have considered up to now, their disinfectant action is not retarded by admixture with serum, but on the contrary, is increased.

Two groups of organic compounds are specially remarkable for their chemotherapeutic action on bacteria. Quinine is the methyl ether of cupreine, and it can be reduced by nascent hydrogen to form hydrocupreine. The following table shows the effect of two derivatives of hydrocupreine in arresting the growth of certain micro-organisms.

| | Ethyl Hydrocupreine (Optoquin). | Iso-octyl Hydrocupreine (Vizin). |
|-------------------|---------------------------------|----------------------------------|
| Diphtheria .. | 1 in 100,000 | 1 in 750,000 |
| Pneumococcus .. | 1 in 400,000 | Negligible |
| Staphylococcus .. | 1 in 500 | 1 in 16,000 |
| Streptococcus .. | 1 in 1,000 | 1 in 80,400 |

The action of optoquin on the pneumococcus and of action on bacteria are certain derivatives of acridine, and lower homologues do not exhibit this effect. Further, these drugs act in the animal body as well as in the test tube, and enough can be given by medicinal doses to animals and men to clear the blood from these micro-organisms.

Acridine Derivatives.

The second group of drugs which exert a marked action on bacteria are certain derivatives of acridine. Trypaflavine was used during the war, for infected wounds; it acts better in the presence of protein, but is not sufficiently selective or specific on micro-organisms in the presence of body tissues to be of any real value; it is easily absorbed and causes oedema. Rivanol is a

more recent derivative of acridine. Morgenroth cured streptococcal infections in mice by injections of rivanol under the skin. The injections, to be efficient, must be made soon after infection and in the neighbourhood of the inoculated zone; rivanol will not cure a blood infection.

The chemotherapeutical substances which are known to act on bacteria are without value in tuberculosis. The destruction of the tubercle bacillus presents two special difficulties: (1) in the fatty and protective envelope surrounding the bacillus, and (2) in the small blood supply to the tuberculous lesions.

Cerium.

Success, however, has been claimed for several metallic compounds, and I shall confine my remarks to three of these. The first is with cerium salts. (Frouin experimented with fifty rabbits and thirty guinea-pigs; they were inoculated with bovine tuberculosis and treated by injections of cerium sulphate. All the animals died, treated as well as controls, but the treated animals survived from two to five months longer than the controls, and in post-mortem examinations showed considerable growth of fibrous tissue in the tuberculous lesions. Grenet and Drouin tried the effects of cerium earths in chronic tuberculous affections in patients. They state that two facts have been established—that these metals reduce the fats of the tubercle bacillus in cultures, and that they produce a mononuclear leucocytosis. Their procedure is to inject intravenously 2 to 5 c.cm. of a 2 per cent. solution for twenty days; this is succeeded by a period of rest for fifteen or twenty days, followed by a second and third series of injections. The patients improved in every way. The bacilli disappeared from the sputum, or if present were modified.)

The treatment is of value only in afebrile cases.

The evidence so far presented is of little real significance.

Copper.

Copper salts have had a great boom in the past. Graf v. Linden in Germany produced a complex copper lecithin compound of secret composition; it was alleged to produce wonderful results in the treatment of patients. It is now more than twelve years since the introduction of this compound, and yet there is an alarming spread of tuberculosis in Germany, and since the war we hear little of the cure. Koga, in Japan, produced cyanocuprol as a cure, but Koga's discovery has not settled the tuberculosis problem in Japan.

When the copper treatment commenced nearly all the reports were favourable to its use (Meissen, Strauss, etc.), but more extended investigations on animals made with the sulphate, oleate, albuminates, cyanocuprol and others have established the fact that so far as these salts are concerned the treatment, at all events on animals, is valueless.

The copper treatment of tuberculosis is not considered to be a specific therapy.

Gold.

Koch showed that $KAuCy_2$ (1 in 1,000,000) prevented the growth of tubercle in cultures; the presence of blood serum interfered with the action and reduced the efficiency to 1 in 25,000.

The results of administering gold salts in tuberculosis were not better than those given by copper, whether on cultures of the tubercle bacillus, on tuberculous animals, or on patients.

Aurocantan was soon found to be too toxic for use, it was succeeded by "krysolgan," introduced by Feldt. Nevertheless, animal experiments with this substance are not very promising, though clinical results, as published in Feldt's monograph in 1923, are certainly both hopeful and inspiring.

The last of the gold cures is that recently introduced by Moellgaard. It is a double thiosulphate of gold and sodium, $Au(S_2O_3)_2Na_2$, which, although a well recognized substance, he calls sanocrysin. Moellgaard

assumes that his gold injections destroy the tubercle bacillus *in vivo*, and states that doses which are not poisonous in themselves kill the tuberculous animal by producing a tuberculin shock. This shock begins with albuminuria and sometimes hæmaturia; it is followed by toxic myocarditis and pulmonary oedema. Non-tuberculous animals do not exhibit this shock.

To combat this shock Moellgaard recommends a previous injection of antitoxic serum, after which his gold cure may be injected with impunity. It would be interesting to know whether other metallic poisons cause a like shock.

Moellgaard made many experiments on calves, rabbits, and other animals to test his sanocrysin, and the treated calves certainly did better than the controls, and some of them recovered. His procedure was as follows: He injected a number of animals on the same occasion; after some days the animal which seemed least affected was chosen as a control. Dr. A. S. Griffith thinks that this was wrong, since the calves may have been infected before they were used for experiment. The injection of the tubercle bacillus would cause those which had acquired some increase of resisting power as the result of a spontaneous infection to react violently for perhaps a week, while the really susceptible animals would remain unaffected; one of the latter would be selected as the control. It is true Moellgaard made tuberculin tests when the animals were three weeks old, but their weights show that they were much older when injected. The experiments of Dr. L. Cobhett at Stansted under the Royal Commission showed that, in spite of ideal conditions and constant care, it was impossible to exclude spontaneous infection.

Another feature of importance in these experiments is that the cultures used were attenuated. The doses necessary to kill were enormous and many control animals failed to die or contract severe disease. The attenuation of the bacilli makes recovery much easier and the large size of the dose intensifies the severity of the reaction to injection in an animal already infected.

So far as I am able to judge of the value of the recorded experiments, they are suggestive, but certainly not conclusive. Some of the krysolgan and copper experiments on animals have been equally suggestive, and with regard to the patients it is early to draw conclusions; it is the opinion of those best able to judge that clinical records of treated patients must be kept for years before the true value of a remedy for tuberculosis can be gauged.

Sanocrysin, then, is still on its trial.

The Sanocrysin Treatment of Tuberculosis.

GREAT claims have been made for the sanocrysin treatment of tuberculosis and so it is necessary that the practitioner should be in a position to form an opinion as to the value of the new remedy. For this reason we reproduce some extracts from Professor Moellgaard's article in the *British Medical Journal* of April 4th, 1925 and also from the report of the Medical Research Council which has been making an investigation of the treatment.

The impression that is formed is that the treatment is no more likely to effect a revolution in the treatment of tuberculosis than the numerous "cures" which have been introduced during the past half century.

Although chemical substances have been employed to a very large extent in the treatment of tuberculosis no real chemotherapy of this disease has hitherto been developed.

To kill and dissolve bacilli in an organism by means of a bactericidal substance very often has the same effect as to inject killed or avirulent cultures—that is, it has an immunizing effect. The injection of the bactericidal substance produces an "ictus immunicatorius" (Ehrlich). Hence chemotherapy not only means bactericidal treatment, but also indirect immunization with liberated antigen. It may, however, under certain

conditions produce another indirect effect. If the antigen is very toxic or is liberated in very large amounts, or the capacity of the organism for building antibodies for one reason or another is diminished, the injection of the bactericidal substance produces a more or less grave toxæmia, increasing in some cases to a deadly effect.

The natural reaction of the therapist to this is to diminish the dose of the bactericidal substance. It must, however, be clearly understood that the effect not only depends on the quantity of the dose, but also on the amount of easily influenceable bacilli in the organism; further experience of chemotherapy has shown us that minimal doses are not only without effect, but in some cases even stimulate the disease ("effectus contrarius"—Ehrlich). Reduction of the dose, therefore, does not always solve the question of toxæmia. Where this effect is prominent chemotherapeutic treatment can hardly be carried through without the help of an active or passive immunization of the infected organism against the liberated toxins. In these cases clinical treatment must be carried out as a combined chemo- and sero-therapeutical treatment.

Krysolgan seems only to have a detoxicating effect in certain cases of pulmonary tuberculosis and to cause quick healing in some cases of localized tuberculosis.

In tuberculosis the question is complicated by two peculiarities in its pathology.

1. The specific resistance of the bacillus of Koch is due to its content of fatty substances, whose presence is the principal reason for the so-called acid-fastness of the bacillus and its resistance to antiformin and other generally employed disinfectants. A bactericidal effect of any compound of a heavy metal on tubercle bacilli is, therefore, not to be anticipated, except subject to the condition that the compound is capable of penetrating the fatty system and so carrying the metal into the body of the bacilli.

2. The peculiarity of the tuberculous tissue, which is of importance in chemotherapy, is its poverty in vessels. This means that a chemical compound must diffuse from the blood through the tissue to reach the tubercle bacilli, and the distance through which diffusion must take place grows longer as the tubercle increases in size and develops in caseification. The hope for chemotherapy in tuberculosis is therefore probably intimately connected with the possibility of finding a substance which diffuses very quickly through animal membranes, and which is sufficiently stable in the organism to be kept unaltered in the blood and the lymph for a relatively long time.

So far sanocrysin appears to be the body which best fulfils this condition.

From animal experiments it appears that sanocrysin in doses of from 1 to 4 cg. per kilo of body weight has very little effect on the sound organism. The weak point in the pharmacology of the substance is its action on the kidneys. This action is, however, avoided when the initial dose does not exceed 1 cg. per kilo nor the maximum therapeutical dose 2 cg. per kilo. Most animals endure bigger doses, and clinical experience has shown that the same is true in a large number of human beings.

On the other hand, the effect on the kidneys seems to be quickly reparable. Even with doses up to 6 cg. the albuminuria disappeared in a few days, and we have never found the lesions of the kidneys to develop in calves into chronic nephritis—even after six months' observation.

A chemical compound which kills tubercle bacilli in the organism will probably cause very serious toxæmia when injected into a tuberculous organism.

The investigations of Koch showed that the healthy and the tuberculous organism react quite differently to the injection of killed tubercle bacilli or tuberculin. In the healthy animal the toxic effect is produced only by large doses of killed tubercle bacilli and takes a relatively long time to develop. Even very small doses of killed bacilli or tuberculin often, in tuberculous animals, cause

very severe symptoms, which develop in a relatively short time, and are signs of an acute intoxication of the organism.

One-third of the sanocrysin dose which is tolerated by the healthy guinea-pig always produces very severe intoxication in the highly tuberculous guinea-pig, and usually kills the animal in sixteen to forty-eight hours.

In tuberculous calves which ordinarily do not die until forty-eight hours after the injection of sanocrysin, the development of the shock, was investigated in detail. Ordinarily it begins with albuminuria, which develops into a grave parenchymatous nephritis. Shortly after the appearance of the grave symptoms of nephritis (increasing albuminuria, cylindrical casts and blood corpuscles in the urine) acute myocarditis appears. The third and last stage in the intoxication in animals affected with pulmonary tuberculosis is an extensive œdema of the lungs, which increases until the animals die, with frothy fluid exuding from the mouth and nose.

Serotherapy of Sanocrysin Shock.

Serum from a calf, affected with chronic tuberculosis for about three months, was given intravenously into two tuberculous calves suffering from grave shock produced by a sanocrysin injection. The result was striking; these calves recovered clinically in a few hours, and the albuminuria disappeared in twenty-four hours. This observation suggested that it might be possible to immunize animals against shock.

A serum was first produced in calves by repeated injections of killed tubercle bacilli and tuberculin. At present it is made by injection of defatted, formalin-treated tubercle bacilli, according to Dreyer's principle. By means of this antigen the strength of the serum has been increased, and it has been possible to make it in horses.

With this serum forty tuberculous calves and goats, suffering from albuminuria after sanocrysin injection, have been treated on more than 120 occasions. In all cases where the infection has been reasonable the albuminuria has disappeared, in most cases very quickly, but in some more slowly, and the shock was totally prevented.

Sanocrysin in tuberculous animals and human beings can produce an acute intoxication, which does not occur when much larger doses are injected into healthy animals, and this intoxication can be prevented or cured by means of a serum made by immunization of healthy calves and horses with defatted formalin-treated tubercle bacilli. Consequently it is possible to confer upon tuberculous animals and human beings a specific immunity against the lethal effect of sanocrysin. This is probably the best proof of the bactericidal influence of this substance upon tubercle bacilli.

Animals with a more chronic tuberculosis very often show a high immunity to shock, and the same is true with certain tuberculous human beings. These animals or patients tolerate the sanocrysin injection without getting any albuminuria or other signs of the shock.

The tuberculous organism, whether naturally immune or made immune by serum, gives very pronounced reactions to sanocrysin, but of another very different type. None of the features of shock appear, but we find instead all the symptoms belonging to the second group mentioned above—the "tuberculous reactions." The most obvious of them are:—rise in temperature, exanthemata, loss in weight, faintness, and intestinal disturbances. Besides them focal reactions in the infected organs are observed with more or less regularity, as happens with tuberculin injections.

One important feature of all the reactions mentioned must be emphasized: they all disappear gradually as the clinical signs of the disease disappear. This fact is very interesting, because it is just what might be expected if sanocrysin is really able to cure tuberculous disease.

Before their total disappearance the reactions to sanocrysin are ordinarily delayed until two or three days after injection. The transitory stage between the disappearance of the clinical signs of tuberculosis in the

lungs and the definite loss of reactions is marked by "late reactions."

In experiments the late reaction has been found only in the last stages of the cure. Where, however, the bacilli are well protected by fibrous tissue (a condition present in many cases of chronic tuberculosis met with clinically), delayed reactions are to be expected from the beginning of the treatment. Clinical experience has shown that "late reactions" two to four days after a sanocrysin injection very often occur.

For the clinician it is of great importance to know that even big reactions may occur as late as four days after one sanocrysin injection, because it tells him that if he injects a fresh dose within this interval he may bring upon his patient the risk of a cumulative effect of the liberated toxins.

The combined sanocrysin-serum treatment has saved the life of even very gravely infected goats, calves, and monkeys, and brought them into a condition of clinical healing. On the other hand, it appears evident from the experiments that a thorough sterilization of the affected organs is very difficult and probably very seldom secured in cases of grave infections.

The best effect of the sanocrysin-serum treatment in the human subject will be obtained in cases of the exudative pneumonic type. Clinical experience seems already to show that this consideration comprises a true idea, the most striking clinical results having been secured in exudative cases.

As was to be expected, the extent and gravity of the tuberculous process set a certain limit for the success of the sanocrysin treatment.

Animal experiments have shown that other diseases in the lungs (mixed infections) may render it very difficult to obtain a curative effect with sanocrysin because the other processes themselves progress or protect the tubercle bacilli against the substance by enclosing them in large sclerotic masses of destroyed tissue. This has been observed in goats gravely infected in both lungs with *Strongylus capillaris* as well as with tuberculosis.

THE FATE OF THE TUBERCLE BACILLI IN THE TISSUE AND THE ALTERATIONS OF THE TUBERCULOUS LESIONS.

In three cases after two to four weeks' sanocrysin-serum treatment, microscopical examination of preparations stained by the Ziehl-Neelsen method showed, particularly in small remaining military tubercles and their surroundings, numerous acid-fast granulations mixed with curled acid-fast and grey, non-acid-fast bacilli.

The Gold Treatment of Tuberculosis.

• *British Med. J.*, April 18, 1925, p. 735.

So much interest has been aroused by the claims made for Moellgaard's gold treatment that the preliminary report by the Medical Research Council will be heartily welcomed by the medical profession. We give extracts from this report.

"Various gold compounds have from time to time been used in the treatment of tuberculosis. Recently a soluble complex salt of gold and sodium—namely, sodium auri-thio-sulphate, which has long been known to chemists, and is now made available under the trade mark of "sanocrysin"—has been introduced to therapeutics as a treatment for tuberculosis, by Professor Moellgaard of Copenhagen, who has found that it has the advantage of dissociation into complex ions, so that toxicity due to free gold ions is avoided. Such toxic effects as this compound produces in tuberculosis but not in normal subjects are attributed to destruction of the bacilli and increased liberation of tubercle toxins; and Professor Moellgaard has also prepared an antitoxic serum for use, when necessary, to counteract these ill effects. The results of experiments on animals and of numerous trials on human patients in some Danish hospitals have been fully described in his book on the *Chemotherapy of Tuberculosis* (autumn,

1924). Critical summaries of these results and of other work in Denmark have been published recently in the *British Medical Journal* and in the *Lancet*. Clinical trials are now proceeding also in Germany and in Canada.

Professor Moellgaard very courteously gave to the Medical Research Council a full supply, both, of the gold salt and of the protective serum, for clinical trial in England, but desired that the preparations should not be made available for general use in medicine until the results of these trials were completed. In December he and his chief clinical colleague, Dr. Secker, visited England, and made a personal communication on the subject to those who were asked to try the preparations; while Dr. Secker remained in London long enough to visit several hospitals, advise on the selection of cases, and give the observers invaluable help during the treatment of individual patients by instruction drawn from his own wide experience.

The preparations were issued by the Council, as on the similar occasion of the introduction of insulin to therapeutics, only to those who were not engaged in private practice—that is, to whole-time professors of medicine or to tuberculosis officers. The Ministry of Health was kept in close touch with the work through a liaison officer. On account of the general interest aroused by discussion of this method of treatment, the Council thinks it desirable to issue this preliminary report on the early results of cases so far treated in Great Britain, and to explain its further policy.

Work in England has been in progress for less than three months; it has not been on a large scale, but the value of the opinions formed has been enhanced by the arrangement which used several observers of small groups working at first independently of each other rather than one observer of a large group. It was evident, when the observers subsequently met in the first conference upon which this report is based, that there was so great a divergence of opinion upon the value of the drug that any single observer, relying solely on his own experience, might easily have been led to a summary opinion that would have been unduly emphatic in his judgment for or against the treatment. The report deals solely with clinical results, and does not consider the laboratory evidence for the effect of the gold salt on tubercle bacilli or infected tissues, nor that for the protective action of the specific serum.

Each dose of sanocrysin was dissolved in 10 c.cm. of distilled water and injected intravenously. The usual amount was 0.5 g. for the first injection and then repeated injections of 1 g. each at intervals of about three days, unless a severe reaction on the part of the patient occurred and compelled delay until the reaction had subsided. The total amount used in any case was generally about 5 or 6 g., and the injections were rarely continued until the goal suggested by the Danish experiences was attained—namely, a final state in which the last injection produced no rise of temperature.

The specific serum, usually from horses immunized by diaplyte tubercle vaccine, though at first a weaker calf serum also received trial, was injected into the muscles in doses of 20 c.cm. Its action is supposed to be that of neutralizing the flood of tuberculous toxins liberated by the action of the gold salt on the infected tissues, and thus of lessening the general severity of the reaction to the chemotherapeutic injection. In cases with heavy tuberculous infection the serum was used either before or together with the first gold injection as a preliminary measure. In mild cases it was not used until a reaction of some severity had occurred, and in many instances it was never used at all.

Effect of Injection of Sanocrysin.

Vomiting was often noticed as an immediate effect within a few minutes of the injection. In one control patient, without evidence of tuberculous disease, there was nausea and prolonged anorexia after three injections, but no rise of temperature or any other reaction. There were no other control observations of cases with

fever from known causes other than tuberculosis, so that the evidence is not sufficient to ascertain whether the gold salt can be used as a test to distinguish non-tuberculous from tuberculous febrile states. In a group of five cases of pulmonary tuberculosis that were clinically mild but radiologically moderately extensive, there were slight pyrexia and trifling albuminuria, but no other features of reaction. The gold salt in amounts up to 5 or 6 g. therefore seemed to be non-toxic for patients with only slight tuberculous lesions.

Severe reactions were generally produced in cases of more extensive infection. The temperature rose within a few hours to 103° or 104°; but there was no case of hyperpyrexia or of critical fall. Vomiting often recurred, but diarrhoea was not often observed. The patient felt ill, depressed, and lost appetite. A metallic taste was sometimes complained of, and there was a tendency to ulceration of the mouth and throat. The rise of temperature lasted three or four days, but was generally less with each successive dose. After the second or third dose rashes often appeared, like those of measles or scarlet fever, and not often itching. In one case an erythematous rash persisted for a fortnight and was accompanied by an outbreak of many indolent open sores. The rashes were seen in cases where no serum had been given. They were perhaps more frequent in cases of closed tuberculous infection.

Albuminuria was a common occurrence, and in some cases exceeded 1 per cent. though it did not last long. No oedema resulted and there was no evidence of persistent renal lesions. Measurements of blood urea were not made in any of the cases of severe albuminuria. In one necropsy, where there had never been more than trifling albuminuria, 8 per cent. of the total metallic gold injected was found in the kidneys on death twenty-eight days after the last injection of sanocrysin. Gold was proved to be excreted by the bowels and by the kidneys after an injection of sanocrysin. Jaundice of a grave nature, which in the Danish experience was a very rare event, occurred in another patient who died, and a relatively large amount of gold was found on analysis of the liver.

Features strongly suggesting that the gold salt had a direct action at the site of the tuberculous infection were often seen. Thus, in the lungs a focal reaction was evidenced by local pain, a sense of tightness, and by prolonged tachypnoea. This was in at least three instances aggravated by the development of a very critical state in which the pulse became rapid and feeble and the patient so collapsed, though the temperature did not fall seriously, that great anxiety was aroused as to the chances of recovery. Except for a local increase of crepitant râles, there were no clear changes in the physical signs in the lungs during these focal reactions. Cough, however, was generally increased and sputum was at first more abundant if the patient had strength for expectoration. Subsequently both cough and sputum tended to lessen.

Headache was never intense. A general state of depression and lack of vitality, together with loss of weight, tended to develop in cases of extensive infection after a course of treatment, and this retarded subsequent recovery in the hospital wards.

Effects of the Injection of the Protective Serum.

Clinical experience varied on this point. At some hospitals nearly every patient had severe serum sickness, perhaps with its own rash and vomiting, and certainly with severe joint and muscle pains. Other observers never saw such effects. The differences were not explained by reference to any particular batch of serum, or to different effect of calf or of horse serum respectively. There were, however, no examples of dangerous anaphylactic phenomena.

It was difficult to form a clear conclusion as to the benefit of the serum. Some observers thought they had proof of its power to control albuminuria and focal reactions in the lungs, if given early and before these features became serious; others were not convinced.

In general, serum was freely used for severe cases of infection. A few trials were made of the influence of the serum on the general state of a tuberculous patient apart from the use of sanocrysin, but they led to no demonstrable results.

Summary of Clinical Results.

Clinical experience in Britain has confirmed the description in Professor Mocilgaard's book, of the immediate effects of sanocrysin, as seen in Danish hospitals. The drug does appear clinically to have a specific action on tissues infected by tubercle bacilli, and the severity of the constitutional reactions does appear to be directly related to the intensity of the tuberculous infection. Further, the drug seems to have but slight toxicity for human patients who are infected by tuberculosis, though in this respect very few control observations have been made. On account of the severity of the reactions in the first tuberculous patients chosen for treatment, no observer at the beginning felt justified in deliberately making control observations in other febrile infections. For the same reason no one cared to begin straight away with the treatment on a large number of tuberculous cases, but each observer preferred to select three or four individual patients and proceed cautiously.

The total number of cases covered by this preliminary report is small—about thirty, of whom twenty-two definitely had tuberculous infections of the lungs. Two of the pulmonary cases died, death in one hopeless case being perhaps accelerated by the treatment, and occurring in the other unexpectedly as the result of toxic jaundice. The remaining twenty do not lend themselves to any numerical analysis. Uncomplicated pulmonary tuberculosis is a disease of which few physicians can confidently foretell the progress, upward or downward, during any given period of two or three months, which was all the time available for these preliminary observations. But it was the opinion of those observers who had had most experience in dealing with consumption that the early cases of open tuberculous infection of the lungs did show some evident improvement, though there was no dramatic benefit, such as that seen with insulin or salvarsan in their corresponding diseases. On the other hand, cases with more advanced disease did not stand the treatment well, and the condition of some of these has been made worse. The latter experience accords with that of Dr. Secker of Copenhagen. Serious cases of long standing cannot endure the treatment in its present form.

There were two cases, not included in the preceding twenty, in which most striking improvement followed at once upon the use of the drug, both the patients having lain three months in hospital previously without making any advance. One appeared to be a case of closed tuberculosis of the lung, spreading out from hilum glands, though it could not be proved that the pulmonary inflammation was caused by tubercle bacilli and not by some other smouldering infection. The other was a case of tuberculous peritonitis with an encysted collection of fluid that vanished at once upon treatment. In each instance the patient showed the rash and rise of temperature that in other proved cases of tuberculosis have followed the injection of sanocrysin. No case of pleural effusion was treated in this preliminary group because the results in this condition would not have offered any decisive evidence. Lupus of the skin, spinal caries, renal tuberculosis, and tuberculous glands are now being treated, but their progress is not sufficiently advanced to be included in this report.

The evidence, therefore, despite the relatively poor results in open pulmonary tuberculosis—and that is unhappily the commonest form of tuberculosis—is sufficiently encouraging to demand further clinical study. This is particularly so in view of the one experience common to all observers—namely, that the drug seems to exert a specific action on tuberculous tissues. The Medical Research Council expects that many months will pass after the issue of this preliminary report before

any further definite conclusions can be drawn. Trial on a larger scale is now justified, and it is hoped to widen the field of work with the help of more observers. But the Council is of opinion that such further trial and extended observations are imperatively required before it can be clearly stated that this gold salt is of value in the treatment of tuberculosis and before it should be made available for general use in medical practice in Great Britain."

Reviews.

MEDICAL EDUCATION.—By Abraham Flexner. New York: The Macmillan Co., 1925. Pp. 334. Price, \$2.50.

THIS volume is a valuable contribution to the study of medical education. It deals with the subject from a comparative point of view and gives a graphic view of the conditions which exist in America, Great Britain and the chief European countries.

Abraham Flexner has already issued a valuable work on medical examinations in Bulletin No. IV of the Carnegie Foundation. An adequate review of the book would form a small treatise on the whole subject of medical education and for this reason it is only possible to deal briefly with some of the chief features of the work and to urge on all who are concerned with medical education to obtain and study the volume for themselves. The first chapter deals with the aims and methods of medical education and points out that these are essentially the same as ever in that they consist in observation, description, inference and verification. The use of modern equipment has given rise to difference in details rather than to new principles. The practitioner employs the same mental processes as the investigator and his training should be of such a kind that he will be capable of bringing an acute and informed intelligence to bear on the problems which confront him in practice.

Medical schools are classed in three groups:—

(1) The clinical which is seen in France and England; this has grown out of the hospital, and the scientific subjects have been appendages of the hospital rather than distinct and autonomous units. In England the scientific subjects are now being emancipated from the control of the hospitals and are being taught more and more by experts rather than by young physicians and surgeons.

(2) The University type of medical school, which was developed in Germany and other northern European countries, has teachers who are engaged in research work as well as in teaching, so that a higher degree of specialization obtains in the staff. The pre-war laboratory equipment of the university schools was ample in Germany and other countries while it remained meagre and poor in England and France. The result was that in Germany the medical student learned from scientists while in England and France he learned from physicians and surgeons.

(3) The third type which used to prevail in America consisted of loose agglomerations of practising physicians who imparted, chiefly by lectures, the empirical knowledge which they possessed. It is quite evident that the American medical education of twenty years ago deserved the low esteem in which it was held.

It must be clearly understood that such a state of affairs no longer exists and that the better students have opportunities of learning their profession which cannot be excelled in any part of the world.

In America and in England the clannish spirit appears to be too prevalent, teachers have little chance of obtaining employment outside of their own medical schools, whereas in Germany a career is open to men of distinction in any of the universities of the German-

speaking countries. Curiously enough it is in the smaller provincial medical schools that distinguished young teachers from other schools have their best opportunities, and for this reason the teaching at these schools is less parochial than in the more famous schools. The pros and cons of whole time clinical appointments are very fairly discussed, and on the whole the verdict appears to be given to the whole time units as being more likely to lead to scientific advances than the system of employing busy practitioners. Probably the ideal will be a combination of the two systems, for the whole time teacher has little experience of the lines of practice which lie outside of the hospitals.

The preliminary education of the medical student is fully discussed, and it is evident that Flexner considers that the students of the continent of Europe have a more definite scholarly general education than the students of England and America.

In England there is a group of students whose preliminary education is of a high standard, but the average medical student has a mediocre intellectual equipment, and so there is a great variation in the quality of the students. In America, on the other hand, all the students, whether they be brilliant or mediocre, go through exactly the same preliminary training and many of them are allowed to enter on the medical curriculum with a poor education.

In the medical course the American student almost invariably passes out after four years whether he be good or bad; during these four years he may have had nearly five thousand hours of instruction, and so there is but little opportunity for the exercise of initiative in the selection of his line of study. An attempt is now being made in some of the schools to break away from this mechanical curriculum. The course of study is far too extensive and far too complete to allow of any academic freedom.

In Germany the student has an almost unlimited power of selecting his subjects and his teachers; all that is insisted on is that he should satisfy his examiners that he has acquired the requisite amount of knowledge. In England there is a six years' course of study of which, however, one year is given up to chemistry, physics and zoology, so that the curriculum is one year longer than in America, but there is more weeding out, so that less than half of the students complete the course in the minimum time. The control is less rigid and so opportunities are given to students to pay special attention to the subjects in which they desire to specialise. There was a feature of some of the German examinations which would appeal to many of the weaker brethren in other countries "a student who fails is re-examined in six weeks, if he fails again he is re-examined and practically no one is allowed to fail a third time." This feature is now being abolished, the student who fails the second time is not allowed to go up again.

An interesting account is given of the varied methods of instruction which are adopted in the different countries and schools, but the conclusion is reached and the responsibility should be laid on the student himself, not on the teacher. This is a most important point which needs to be stressed in the Indian medical colleges, as Flexner rightly says "the student who needs to be controlled from day to day, has mistaken his calling". It is interesting to note that the practical work in physiology, etc., which is so extensively adopted in the British schools is greatly neglected in Germany and France.

It is curious to read that in France a student may graduate without ever having seen a post-mortem done. Flexner summarises his views on the improvement of American medical education by insisting that the schools should adopt the university freedom which exists on the continent of Europe and the selection and fostering of the most able students which is a feature of the English schools. The clinical teaching in

Britain is regarded as the soundest, there is a preliminary course in physical diagnosis, then the student takes up a clinical post under the eye of the qualified staff: in fact he learns the work of the doctor by doing what the doctor has to do and by being shown his mistakes. Lectures take a subordinate place, and there is great laxity in the attendance on these unless the students find them instructive and entertaining. The defect of the system of clinical teaching is that it is too practical and lacks the scientific spirit which is so prominent in the British teaching of physiology.

In France it is only the favoured few who ever get an opportunity of going through the apprenticeship which is so valuable a feature of the British system. The French system is also defective in that the student is plunged into the technicalities of clinical work before he knows anything of anatomy and physiology.

The German system consists chiefly of admirable demonstrations; it differs from the British system in that the apprenticeship method is not adopted. The student has plenty of opportunities of watching the masters at work, but they seldom get a chance of doing things for themselves. In America the training tends to be didactic and spoon feeding is the rule, but practical training is obtained by the majority of the young graduates by taking an internship in a hospital after graduation. Curiously enough the chief criticism of the American system is that it is over organised, over co-ordinated and over administered.

The influence of examinations on the student's work is rightly emphasised. The combination of oral, written and practical examinations is regarded as forming the best test. The examination of the Conjoint Board in England is regarded as being excessively practical but we are inclined to think that it is hardly possible for final medical examination to err in the direction of being too practical.

There is a thoughtful chapter on institutes for medical research and their relationship to medical education. "The institute for medical research is not to be regarded as something fundamentally different from the university faculty of medicine; it is a partial faculty, a co-operative group of workers devoted to training as well as to investigation."

The chapter on the costs of medical education is of great interest; fifteen years ago the German universities were far better equipped than any others, the salaries of the professors were paid by the State and the fees of students went to swell the total income of the teachers; at that period the expenditure in England and America was much less, it came almost entirely from the fees of students and the laboratories were poorly equipped for the most part. At the present time Germany is much worse off, France is not so well provided for as it was, in England some headway has been made, thanks to the fact that Government has provided a certain amount of financial aid, but it is noted that far greater sums will be needed to provide modern facilities and to maintain a competent scientific personnel.

America is in the fortunate position of having vastly greater resources at her disposal than she had fifteen years ago, the funds coming partly from State sources, but largely from private benefactors.

Part of the increased budget has gone to provide better buildings, better equipment and a larger staff of teachers, but there is a tendency to over organise and to spend too much on administrative expenses. At the same time the number of students under training has been rigidly restricted, so that the cost of training each medical student is far in excess of what it was a few years ago.

Flexner has not produced a universal panacea for the ills of medical education; each country and each medical school has its own problems which cannot be solved by any cut and dried scheme; but all who are interested in medical education must read Flexner's book, it constitutes the only existing scientific study

of the subject. It is written in an easy and interesting manner; and invariably we find that both sides of the question are stated.

MANSON'S TROPICAL DISEASES.—Edited by Philip H. Manson-Bahr, D.S.O., M.A., M.D., D.T.M. & H. (Cantab.), F.R.C.P. (Lond.). Eighth Edition, Revised. Demy 8vo, about 916 pages, with 6 maps, 20 colour plates, 7 halftone plates, 387 figures in the text and 33 charts. London: Cassell & Co., 1925. Price, 31s. 6d. net.

THE appearance of a new edition of Manson's "Tropical Diseases" is always an event of great interest to medical men in the tropics. This eighth edition in one sense forms the coming of age of the book as it is the twenty-first time that it has been reprinted since it was first published in 1898.

For some years Manson's book was the only satisfactory guide to the student of tropical diseases and it has probably been the chief influence in stimulating the study of exotic medicine by English-reading medical men. It is a matter of great regret that the master-mind of its original author has been removed by death since the appearance of the last edition in 1921.

The chief features of this edition are:—

(1) It has been brought thoroughly up to date by Dr. Manson-Bahr who has long been associated with the editing of the book.

(2) Six new maps have been prepared; these show clearly the distribution of some of the more important tropical diseases.

(3) The section on medical zoology has been entirely re-written.

(4) The work has been remodelled to bring it abreast of recent developments in tropical medicine.

(5) Ninety-four new illustrations have been supplied.

(6) The book has been kept within reasonable compass, being shorter than the previous edition by about 70 pages.

These points suffice to show that every effort has been made to adapt Manson's great work to modern requirements and it is certain that its popularity will be well maintained.

In reviewing the former edition a few errors of importance were pointed out, these have been removed in part but it is necessary to protest again that the seven-day fever of Japan is quite distinct from Roger's seven-day form of dengue and that epidemic dropsy is not the same disease as war oedema or famine dropsy.

It is natural that there should be sharp differences of opinion regarding many debated points in tropical medicine and no useful purpose would be served by entering into a discussion of these in a review like this, but if there are reasons for adopting views widely divergent from those of other workers on tropical medicine these should be stated by the author.

In discussing the treatment of liver abscess it is stated that "the surgeon must be prepared to drain the abscess if pus be discovered; once diagnosis is established nothing is gained by delay" but later on we find that the editor himself has successfully treated 15 cases by aspiration alone combined with emetine treatment. Presumably the former statement has been allowed to stand by an oversight, but it certainly conveys a wrong impression of the accepted modern treatment of liver abscess.

We also think that it would be wiser in the case of a patient who is in the "pre-black-water-state" or who has previously suffered from the disease to desensitize him by giving minute and gradually increasing doses of quinine rather than to give doses of 5 grains of quinine straight away.

In the chapter on kala-azar the description of the aldehyde test (or formal-gel reaction, as the editor persists in calling it) is misleading.

As his experience is limited to six "well-marked" cases of kala-azar his expression of the opinion that the test is untrustworthy need not be taken very

seriously but we must quarrel with his statement that "Napier himself states that 'jellification' may be taken as absolutely diagnostic of kala-azar". Napier has certainly never made such a statement; he has always insisted that opacity rather than jellification is the change on which the diagnosis of kala-azar is dependent, that jellification alone is frequently observed in other conditions but that jellification plus complete opacity is the only change that is absolutely diagnostic of kala-azar.

To pick out flaws and to indicate differences of opinion is easy, but to do so on a large scale would create an entirely wrong impression of the book: it forms a clear and masterly exposition of sound modern teaching in tropical medicine and will doubtless continue to be the most popular text-book on the subject. There are nearly 400 excellent illustrations and 27 beautiful plates, the general "get up" of the book is of the highest standard and the price moderate when everything is considered. We congratulate the author and the publishers on their achievement in producing so worthy a successor to the previous editions of Manson's "Tropical Diseases".

MEDICAL OPHTHALMOLOGY.—By R. F. Moore, O.B.E., M.A., B.Ch. (Cantab.), F.R.C.S. Second Edition. London: J. & A. Churchill, 1925. Pp. 344, with 8 plates and 92 illustrations. Price, 18s. net.

The first edition of this book has been a great success and regarded as the best book on the subject in the English language, and this new edition is a great improvement on the earlier one.

The whole book has been revised, and made fuller and more systematic and is now a very complete resumé of a branch of ophthalmology which is becoming of more importance day by day, as the relationships between morbid conditions in the eye and diseases of other parts of the body are worked out; and in many diseases, especially those of metabolism, and of the nervous system, the ophthalmologist can give material help in a difficult diagnosis to the physician.

The indexing and arrangement of the book is excellent, rendering reference to any point easy, and the addition of 8 new coloured plates and a number of black and white illustrations, all well done and useful, adds greatly to the merits of the book.

It should be in every ophthalmic library, and should be studied by every physician who wishes to be up-to-date in modern methods of diagnosis.

AN INTRODUCTION TO SURGICAL UROLOGY.—By William Knox Irwin, M.D. (Aberd.), F.R.C.S. (Edin.). London: Baillière, Tindall & Cox, 1923. Pp. viii plus 180. Price, 7s. 6d. net.

The author claims for this book that it gives 'the main facts of the subject in short compass'.

The anatomy of the part concerned and the examination of the patient occupy the first two chapters. The subsequent chapters deal with the prominent symptoms of urinary diseases, their ætiology and treatment. The last chapter describes the pathological changes occurring in the prostate in later life.

The book is necessarily limited in its scope, but will prove valuable to students about to begin the study of genito-urinary diseases, and also to practitioners who require a small book of ready reference.

MEDICAL AND SURGICAL REPORT OF THE ROOSEVELT HOSPITAL, NEW YORK. (Second Series) 1925, based on the work of the years 1915—1924 inclusive. Paul B. Hoeber, Inc.: New York. Pp. 378. Price, \$5.00 net.

This excellent volume compiles the second series of 34 articles and written by 22 members of the Hospital Visiting Staff.

It contains both medical and surgical articles and is full of interest. The varied subjects are discussed in a concise, clear way and form delightful reading. The

articles are essentially practical and contain a large quantity of scientific information. The illustrations are numerous and deserve a special word of praise and add greatly to the value of the book.

A summary completes the ending of most of the articles. The two articles on partial colectomy are especially good and the technique employed is made easy to follow by the many illustrations.

Other excellent articles are the two on breast tumours and the surgical treatment of chronic duodenal and gastric ulcer. The author is to be congratulated on the successful treatment of a case of cerebellar abscess.

We cannot agree with the author in his methods in the treatment of fracture of the femoral shaft in adults. The apparatus devised by Hamilton Russell of Australia in which no splint is used and largely employed in this country, has proved eminently satisfactory and renders skeletal traction far less common.

The book will be found most useful to the surgeon and physician and we thoroughly recommend it as likely to find a useful place in their library.

AN INTRODUCTION TO THE MIND IN HEALTH AND DISEASE.—By T. Waddelow Smith, F.R.C.S. (Eng.). London: Baillière, Tindall & Cox, 1925. Pp. viii plus 236, with 6 coloured plates. Price, 10s. 6d. net.

This work is intended as an introduction to the study of mentation, a stimulus to students entering upon this subject and an aid to general practitioners in dealing with cases of psychic origin.

The author in his preface stultifies himself at once by admitting, what is at once obvious to anyone with any knowledge of this subject, that many controversial and hypothetical points have been dealt with in the text as facts. This at once destroys the value of such a work and nullifies the attainment of its stated purpose. Students and tyros cannot be too accurately instructed and to give them as facts only one side of a question on which controversy is acute is wholly wrong and undesirable.

The book too seems badly balanced, some aspects of the subject being dealt with in too elementary and cursory a manner while other aspects are infinitely more scientifically dealt with.

The sections dealing with psycho-analysis are interesting as they unwittingly lay bare most of the defects and fallacies of the Freudian school. The author's remarks, that no one should dare to practice it before, if he be a man, the age of fifty, if a woman, that of forty, because the emotional tone is so strong in the healthy minded before that age that there is a great likelihood that it would drive everything before it and compel the analyst to close his work, give one food for thought. How about the climacteric period in woman, is it not an admitted fact that the emotional tone in woman is markedly unbalanced at this critical period of life?

The above is but one of several similar statements that have been noted and speaks for itself.

On the whole, therefore, the book is one which does not seem to us to appeal to any class of reader.

A CLINICAL HANDBOOK OF MENTAL DISEASES.—By Lieutenant-Colonel W. S. J. Shaw, I.M.S. Calcutta: Butterworth & Co. (India), Ltd., 1925. Pp. 235, with 2 charts. Price, Rs. 3-8 net.

COLONEL SHAW has given us a book on mental diseases which will appeal to all medical students and practitioners throughout India. The book is no more than it pretends to be, i.e., a handbook. There is no superfluous material in it and it covers every aspect of psychiatry which is at all likely to be of use to anyone in the practice of medicine. It will prove a ready reference to the busy general practitioner when procedure as to the proper disposal of mental cases is in question. At this time when the teaching of psychiatry in the medical schools of India is in the hands of teachers, who, with few exceptions, know little of their

subjects, it is opportune that a handbook of this nature should be available to all medical men in India to whom psychiatry has been and is a neglected subject.

Colonel Shaw has had many years' experience in India in the practice of psychiatry. Unlike most authorities in this subject who strive to be original, this handbook expresses no dogma, is very readable, technical terms are explained in a simple manner and no attempt is made to coin words or overwhelm the uninitiated mind with high-sounding terms so dear to the psycho-analytical school. The classification adopted is that of the official "Nomenclature of Diseases." The legal aspect of psychiatry is adequately dealt with as regards procedure in so far as it may affect the general practitioner. There is also a chapter on the lay-out and construction of a mental hospital in India with two sketch plans which are self-explanatory. This chapter contains many useful hints in mental hospital construction in India. A chapter is also devoted to procedure in regard to military insanes as well as to the transmission of insanes to England and elsewhere.

In a book of this nature it is impossible to deal adequately with the subject in hand, but sufficient is explained in order to give the student a bird's-eye view of what he is looking for. On the whole the chief defect of the book is its brevity but it has succeeded in what, to my mind, are the two chief drawbacks in books on this subject, namely, the tendency to use a prolixity of words and abstruse phrases and to fill in the context with histories of cases which are too much of the smoke-room type for a sober text-book on psychiatry.

One minor point of criticism suggests itself—the general construction of the book. It is unprepossessing in appearance and in not a few instances someone has blundered in the spelling of words.

IMMUNITY IN NATURAL INFECTIOUS DISEASE.—

By F. d'Herelle. English Edition by G. H. Smith, Ph.D. Baltimore: William & Wilkins Co., 1924. Pp. 400. Price, \$5.00.

It is impossible in a short review adequately to describe an important work of this kind which is on highly original lines. In it the author's views on many problems of immunity are set forth, views which are strikingly different from those held by many leading workers. One cannot fail to be struck by the freshness of Dr. d'Herelle's treatment of many familiar subjects, but whether his views will prevail remains to be seen. With regard to the bacteriophage there is of course nothing *a priori* improbable in the idea of the existence of forms of life which may attack bacteria. Ideas on the subject of bacteria are apt to be anthropocentric. He makes a good deal of the point that laboratory studies on immunity have largely been carried out on refractory animals, and are therefore divorced from the evolution of natural immunity in the susceptible. The mechanism of natural immunity is no doubt different in different cases. In some cases it would appear to be really acquired immunity. In other instances its origin is obscure.

The book is powerful and stimulating and it will take its place among standard literature on immunology.

The translator has rendered the book into clear and forceful English.

FORENSIC MEDICINE.—By Harvey Littlejohn, M.A., M.B., B.Sc. London: J. & A. Churchill. Pp. 285, with 183 illustrations. Price, 15s. net.

PROFESSOR HARVEY LITTLEJOHN has made an important contribution to medico-legal literature by publishing an atlas of selected medico-legal subjects from specimens in his collection.

The chief feature of the book is the numerous splendid illustrations. Short descriptions of these and introductions to the various subjects are also given. Illustrations in medico-legal works are frequently unconvincing, and the photographs in this work are better than anything we have previously seen. Among

the subjects considered are post-mortem conditions, drowning, hanging and strangulation, the effects of firearms, burns, cut throat, wounds, fractures, etc. Especially interesting is the account of gunshot wounds. The book concludes with some excellent photographs of the hymen, illustrating various types. The author points out that the opinions of medical men as to the presence or absence of rupture of the hymen are frequently erroneous owing to insufficient knowledge of the various types of hymen in the virgin.

Being from the pen of Professor Littlejohn, this work is, of course, authoritative, and it will take its place among the leading medico-legal works of our time. The book is an excellent one and should be in every medical library.

A TEXT-BOOK OF PATHOLOGY.—By J. Martin Beattie and W. E. Carnegie Dickson. Third Edition. London: William Heinemann (Medical Books), Ltd., 1925. Pp. 1103, with 499 illustrations in the text and 17 coloured plates. Price, 42s. net.

A DETAILED description of this well-known book which is now in its third edition would be superfluous. The popularity of the first edition is demonstrated by the fact that it was necessary to reprint it five times.

Much new matter has been added since the last edition but this has not been done at the expense of the material contained in the last edition.

In the first half of the book the nature of the pathological changes that occur in the body are well described. The hundred pages on the subject of animal parasites, protozoa, helminths and arthropods, will be of particular interest to readers in this country. The life history of the malarial parasite is well demonstrated by diagrams and there is a very good coloured plate of the forms that are encountered in the peripheral blood. The most recent work on the amœbæ and the intestinal flagellates has obviously been carefully consulted before the chapter on protozoa was written.

In the second half of the book each system or organ is dealt with in a separate chapter. The pathological changes that occur in the blood are well shown in a number of very beautiful coloured plates. The subject of ductless glands has been dealt with sufficiently fully and this chapter has been brought up to date, but the authors have not allowed themselves to be unduly influenced by the present boom.

The book is well written, well illustrated (by nearly 500 clear text figures and 17 coloured plates) and well printed. The student or practitioner will experience great difficulty in finding a better book on pathology.

INTERNAL SECRETION IN HEALTH AND DISEASE.

—By Captain Y. M. Bose, M.D. Calcutta: Butterworth & Co. (India), Ltd., 1925. Pp. 550, with 43 illustrations. Price, Rs. 12 net.

DURING the last decade the literature published on the internal secretion and ductless glands has been so vast that it has been difficult for an ordinary practitioner to follow it. A number of handbooks have been written to keep him in touch with modern advances in endocrinology and Dr. Bose's book is one of this type. It reviews fairly fully all the latest work on the internal secretion and gives the accepted views in a clear and concise form leaving out all controversial details. The subject matter is well arranged and we have no doubt that the book will be useful to both the student and practitioner.

BULLETIN NO. XI OF THE INTERNATIONAL ASSOCIATION OF MEDICAL MUSEUMS AND JOURNAL OF TECHNICAL METHODS. New York: Paul B. Hoeber, 1925. Pp. 151. Price, \$3.00 net.

THE eleventh of these valuable bulletins appeared on May 4th, 1925.

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The editorials are interesting and especially that dealing with pathological service.

It stresses what should be obvious to all teachers in medical schools:—the value of autopsies to the medical service in the hospital.

The handicap to a hospital, and especially to one in which medical students are being taught, of restriction of the number of post-mortem examinations carried out, is very great indeed.

Original communications are of interest and there are, as well, many short descriptions of simplified methods of technique applicable in the museum and the laboratory.

These bulletins, and, in fact, membership in the Association, are of a great deal of value to hospital and medical college pathologists.

A TREATISE ON MATERIA MEDICA AND THERAPEUTICS.—By the late Rakhaladas Ghosh. Tenth Edition by B. N. Ghosh, F.R.F.P. & S. (Glas.). Calcutta: Hilton & Co., 1925. Pp. 718. Price, Rs. 7-8.

THE fact that this book has gone through ten editions since 1901 is sufficient proof of its popularity. The present edition has been brought up-to-date and many recently introduced drugs, such as new compounds of antimony and bismuth, carbon tetrachloride, insulin, etc., have been included. We strongly recommend this edition to students and practitioners.

Annual Reports.

ANNUAL REPORT OF THE BURMA GOVERNMENT MEDICAL SCHOOL, RANGOON, FOR THE YEAR 1923-24. BY LIEUT-COLONEL A. WHITMORE, M.D., I.M.S. RANGOON: SUPERINTENDENT, GOVERNMENT PRINTING, BURMA, 1924. PRICE 4 ANNAS.

THE year commenced with 175 students on the roll, and, though the school is still a small one, its numbers are steadily growing, 32 new students being admitted during the year, all of whom had passed either the High School Final or the Matriculation examination. Twenty-two students passed out during the year, and there were 10 casualties. Forty-five third year students were sent to Madras to undergo training in practical midwifery at the Government Maternity Hospital there, as there is no local provision in Rangoon. It is hoped however that facilities will be provided at the Dufferin Hospital, Rangoon.

There were numerous changes of staff during the year, owing to the transfer of officers,—a matter which seriously affects the teaching in all medical schools in India. Receipts during the year amounted to Rs. 5,130 and expenditure to Rs. 1,00,908. The annual prize distribution was held on December 20th, 1923 when His Excellency Sir Harcourt Butler was present. The sports at the schools are still hampered by the want of a playing field in the vicinity of the school, but the students carried off the Junior League Challenge Cup and were runners up in the Junior League Football competition. The School Union also took a very active part in the Health Week Exhibition.

PROCEEDINGS OF THE ASSAM BRANCH, BRITISH MEDICAL ASSOCIATION ANNUAL MEETING, JORHAT, 2ND MARCH 1925. CALCUTTA: THE LYONS PRESS.

THE Annual Meeting of the Assam Branch of the British Medical Association took place at Jorhat on March the 2nd. Dr. E. T. Jameson in his presidential address reminded the Meeting that at the termination of their last Annual General Meeting there were several matters left in the hands of the Committee to carry through. These included, (1) the proposal for the manu-

facture of Vaccines for Pneumonia, and that this matter should be put before the Government of Assam with a view to the work being undertaken by the Pasteur Institute in Shillong; (2) to reply to certain correspondence with the Dominions Committee with reference to the subject which was before the Meeting under the name of "Care of Labour;" (3) to approach a recognized Medical Transfer Agent with regard to assisting,—with advice to intending applicants for appointments in Assam.

Certain difficulties have arisen with regard to the preparation of vaccine at the Pasteur Institute, Shillong. The Calcutta School of Tropical Medicine has been approached on this subject; although expressing their willingness to help in the matter, they have pointed out that the manufacture of vaccine on a large scale is a matter of funds. The matter is now in the hands of the Indian Tea Association. A reply was sent to the Dominions Committee and, with regard to the question of medical officers, the Secretary of the Indian Tea Association has suggested that grievances of newly arrived medical officers be referred to the Council of the Association.

Conditions for the medical man in the province have improved very considerably during the last few years, roads are better and he is supplied with better equipment, so it is to be hoped that more research work will be done and some of the many problems that are outstanding—such as Naga Sore,—may be solved.

Dr. G. C. Ramsay gave a few impressions on some diseases of Assam. One of the most important diseases in the tea gardens in Assam is pneumonia which in some gardens has accounted for 30 to 40 per cent. of the total deaths. One of the main causes is the habit of sleeping on the damp ground, (or on the roadside after a drinking bout) and it seems possible that if the coolie could be induced to sleep regularly on a machan this cause of death would be reduced.

Tertiary lesions of syphilis appear to be much rarer in malarious districts and parasyphilitic lesions are almost unknown.

Bacillary dysentery represents 95 per cent. of the dysenteries in Cachar and it seems worth the while of the Government of Assam considering the advisability of manufacturing serum in this country instead of depending on the products from America and England which have undergone deterioration in transit.

There are many other medical problems which are awaiting solution in this province, as for example Naga Sore and epidemic conjunctivitis. It seems a pity that the Government of Assam should curtail the activities of the Pasteur Institute at Shillong, the only institution in the province in which research work can be carried out.

Lieutenant-Colonel F. J. Palmer, R.A.M.C. (retd.) read a paper on the treatment of leprosy by metallic salts. He advocated the giving of copper sulphate gr. $\frac{1}{2}$ daily for three weeks; the treatment should then be suspended for a week and the salt again administered.

He quoted a few cases in which improvement had occurred.

He concluded:—

(1) That in copper and bismuth salts we possess two of the most powerful agents yet introduced for the treatment of leprosy.

(2) They are very inexpensive, at least at present.

(3) They both, earlier or later according to frequency and dosage, produce focal reactions in leprotic tissues.

(4) That this reaction would appear to be curative, and that even advanced cases have so improved as to justify the hope that final cure is not far off.

(5) That with increasing knowledge speeding up may be possible.

(6) That cure can only take place through a series of reactions, and that these may be severe in advanced cases, and for a time make the patient appear worse.

(7) That the potentialities of oral administration of copper, and with less certainty, those of intramuscular bismuth are worthy of trial.

On a few occasions during the past year, when unexpected ulcers began to appear in apparently new places, and when the patient's condition appeared to be worse, I have faltered by the way, and my courage has well nigh failed me. Now, with increasing confidence, I believe we can look forward to the end, and, when further experience in the use of these, and perhaps other compounds, has been gained, to the permanent cure of leprosy in the great majority of the sufferers whom it now afflicts. In advanced cases, however, it will not be easy, and courage and perseverance will be required from patient and physician, and a good deal of faith from both.

Lieutenant-Colonel S. R. Christophers, I.M.S., read a paper by the members of the Kala-azar Commission on the kala-azar transmission problem.

Rogers' discovery of the flagellate stage of the parasite first pointed to the possibility of insect transmission, but it must be borne in mind that some other means of transmission may occur. There is a still further possibility that man may be only a cul-de-sac and that the infection may be transmitted from a plant, an insect or any other vertebrate. Evidence goes to show that transmission occurs from man to man but this is as yet not proven. Infection may take place from man to man directly, as in contagious disease, indirectly, as in cholera, typhoid, etc., or by means of an intermediate host. Experimental work has so far not supported the first theory. The second theory is supported by many laboratory observations and has a certain amount of epidemiological support; we are carrying out work to test this theory at present. This brings us to the third theory which is the most probable one. The intermediate host might be an intestinal worm, such as anchylostoma, or it might be a blood-sucking insect. The possibility that *Anchylostoma* is the intermediate host has been to a certain extent negated by many observers. Up to the end of last year little progress had been made with any insect; the bed-bug was tried because under artificial conditions development of the parasite of the disease occasionally took place in its gut. The first real advance was made when Knowles, Napier and Smith of the Calcutta School of Tropical Medicine demonstrated that flagellates could be found in the gut of laboratory-bred *P. argentipes* after the sandfly had been fed on the blood of a kala-azar patient. The results of these workers have been confirmed by the Commission working in Assam. There appears to be no doubt that not only flagellation, but rapid and characteristic multiplication of forms takes place. Proof that the sandfly is the transmitter of the disease is, of course, still wanting but it must now be considered the principal suspect. Another group of insects on which epidemiological observation has thrown suspicion is the culicoides; many varieties have been found in Assam but so far no support has been gained from laboratory experiences.

Dr. F. W. O'Connor in a very short paper made a plea for the more extensive use of the electric sigmoidoscope in tea garden practice. By means of this instrument it was possible to see the conditions which could otherwise only be guessed at even if repeated microscopic examination of the stools were made.

Dr. C. Strickland read a paper on the mosquito factor in the malaria of Assam and its prevention. This paper will appear *in extenso* in an early number of the *Gazette*.

CENTRAL PROVINCES AND BERAR, ANNUAL PUBLIC HEALTH REPORT FOR THE YEAR 1923. BY LIEUTENANT-COLONEL T. G. N. STOKES, M.B., I.M.S. NAGPUR: SUPERINTENDENT, GOVERNMENT PRINTING, C. P. 1924. PRICE, RE. 1.

THE monsoon began somewhat late, but the total rainfall was normal except in the west of the Central Provinces where it exceeded the average by 20 per cent. The climatic conditions of the year were generally favourable to public health; crops were good, prices of food-grain lower than in the year 1922, water was

plentiful and there was no epidemic disease except mild outbreaks of plague and cholera in a few districts.

The birth-rate of the year is the highest during the past five years, the number of births registered being 45.63 per 1,000 of the population against 35.80 in the previous year and 38.08 in the last quinquennium. Deaths numbered 30.53 per mille as against 29.31 in the preceding year and 51.85, the quinquennial figure. The mortality amongst children is always far in excess of that amongst adults, and with a high birth-rate, an increase in the death-rate is a normal feature; it is therefore satisfactory to find that, notwithstanding the high birth-rate of the year, the death-rate is little in excess of that of the previous year which was the lowest recorded for 20 years.

Children under five years of age were responsible for a little more than half the total mortality. Of these children one-third (32.9) were infants, of whom 10 per cent. (9.8) died in the first week, from natal or prenatal causes. The problem of infant mortality is receiving considerable attention and it is satisfactory to note that many municipal committees are beginning to realize their responsibilities in this matter and have provided for the visiting of mothers and infants by a municipal midwife or female sub-assistant surgeon. The Maternity and Child Welfare League in Nagpur, the management of which was taken over by the Municipal Committee, has obtained some striking results. The large decrease in the death-rate among infants under one month in the area under its charge proves that many deaths among infants are preventable if the problem of infant mortality is approached scientifically. During the period under review Nagpur city organised a Health Week and a Baby Show in October and November. Amraoti also celebrated a Health Week in December. On the initiative of Her Excellency the Countess of Reading a National Baby Week was celebrated during the third week of January 1924. These celebrations evoked an encouraging response and aroused great interest in many places. They have undoubtedly a great educative value and have stimulated among considerable sections of the public a realization of the importance of national health both to individuals and to the country generally.

The Director of Public Health reports that the Publicity Officers and also the officers in charge of travelling dispensaries have performed a large amount of useful propaganda during the year, especially in connection with Baby Week. He urges that the former should be made permanent and the number of travelling dispensaries increased. The Local Government agreed that steps should be taken to strengthen the publicity section of the Public Health Department at an early date, but unfortunately the attitude of the Legislative Council in refusing all grants prevented the Local Government from providing the sums necessary for this purpose. Any considerable extension of the activities of the Public Health Department in the direction of publicity must be dependent on the voting of funds by the Council. Much can be effected by District Councils and Municipalities in the problem of infant mortality and in general publicity work.

As usual, fever was responsible for the great majority of deaths. Out of the death-rate of 30.53 per mille, 16.79 per mille are attributed to fever, while plague caused 15,867 deaths, the ratio of the latter being 1.14 per mille of the population. The Director is of opinion that if reasonable and timely measures had been taken in Jubbulpore, Akola and Yeotmal, the plague epidemic would have been far less severe. In Nagpur during the last six years a systematic, vigorous and sustained campaign of rat extermination has been pursued, and in that period notwithstanding the fact that the surrounding localities have been badly infected, that from time to time imported cases of plague have occurred, and that amongst the rats trapped a few have been found to be suffering from the disease, there has been no plague epidemic in Nagpur. The immunity of Nagpur has attracted the attention of other municipal committees, and rat extermination campaigns have been undertaken

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in many of the larger towns. It is an established fact that certain towns constitute centres from which plague infection spreads annually over the province, and it is of the utmost importance that anti-plague measures should be undertaken not only in the interests of the residents of such towns but for the safety of the whole province. It is however, regrettable to find that some municipal committees do not realize their responsibilities in this matter. Thus in Jubbulpore, whence annually plague spreads over the north of the province, the municipal committee on the ground of retrenchment has reduced its grant to the hospital, decreased its sanitary staff, refused to provide a salary sufficient to employ a fully qualified health officer, and failed to undertake vigorous measure for the prevention of plague. When it is remembered that the financial difficulties of the municipal committee arise almost entirely from the annual plague visitation, which by the consequent dislocation of trade reduces the income of the municipality, the attitude of the committee is the more to be regretted.

Owing to the financial position in the province Government was not in a position to increase its grants for sanitary schemes. Recurring grants were made amounting to Rs. 36,724, which is approximately equal to the grants given in the previous year. Rs. 10,000 were also granted for the improvement of the water-supply in rural areas in Berar. The financial position has now fortunately improved.

The total income of municipal towns in these provinces in the year 1922-23 exclusive of loans and balances was Rs. 52,01,531 as against Rs. 47,48,357 in the preceding year. Of this amount, Rs. 19,80,277 was spent on public health purposes. This represents 38 per cent. of the total as against 46 per cent. for the year 1921-22 and 50 per cent. for the year 1920-21. This reduction in expenditure on public health is regrettable, but there is some reason to suppose that as a result partly of the publicity work which has recently been undertaken, local bodies are beginning to realise their responsibilities in this matter. Much can be done without additional expenditure, by careful supervision, by the enforcement of sanitary by-laws, and by the personal influence of members of local bodies. The Director's report makes it clear that there is room for improvement even in the larger municipalities.

Correspondence.

INDIAN SCIENCE CONGRESS.

To the Editor, "THE INDIAN MEDICAL GAZETTE."

SIR,—The Indian Science Congress is to be held in Bombay during January of next year.

As President elect of the Medical Research Section I am writing to ask whether you will be good enough to contribute one or more papers yourself and induce those working with you or under you to do likewise. Papers should be of a length that they do not exceed ten minutes in the reading and they should, if possible, be the results of research or at least have a bearing on some problem of research or be of such a nature as to stimulate discussion on the scientific aspect of some medical problem. This means that purely clinical articles are not suitable.

As I am shortly leaving for England for a short visit, I wish particularly to emphasize the fact that abstracts and preferably the complete paper should be in the hands of Major J. Morrison, I.M.S., Acting Director, Bombay Bacteriological Laboratory, Parel; by October 15th at the latest, otherwise printing of such abstracts and papers may be impossible.

I shall be further obliged if you will kindly signify to Major Morrison as early as possible your intention to contribute a paper and on what subject.

Please also show this to any of your friends who might contribute papers, as it is impossible for me to

know every one in different parts of India who is engaged in Medical Research.—Yours, etc.,

R. ROW, M.D., B.Sc. (Lond.), D.P.H.

BOMBAY BACTERIOLOGICAL LABORATORY,

PAHEL,

18th August 1925.

Service Notes.

APPOINTMENTS AND TRANSFERS.

Lieutenant-Colonel A. Fenton, M.B., I.M.S., Officiating Inspector-General of Civil Hospitals, Burma, is confirmed in that appointment, with effect from the 9th June 1925.

Lieutenant-Colonel J. McPherson, I.M.S., as Agency Surgeon, is posted as Residency Surgeon, Mysore, with effect from the 29th July 1925.

Lieutenant-Colonel H. Innes, M.B., I.M.S., is appointed to officiate as Inspector-General of Civil Hospitals and Prisons, Assam, during the absence on leave of Colonel C. H. Bensley, C.I.E., K.H.P., I.M.S., or until further orders.

The services of the undermentioned officers are placed permanently at the disposal of the Government of Burma, with effect from the dates shown against their names:—

Major S. T. Crump, I.M.S. 1st January 1920.

Lieutenant-Colonel E. T. Harris, D.S.O., M.B., I.M.S. 9th March 1921.

Major H. A. H. Robson, M.B., I.M.S. 13th December 1920.

Major F. Stevenson, I.M.S., an Officiating Agency Surgeon, was posted as Agency Surgeon, Gilgit, with effect from the 1st November 1924.

Major L. H. L. Mackenzie, I.M.S., an Officiating Agency Surgeon, was granted leave on average pay for 8 months combined with leave on half average pay for 1 year and 24 days, under Fundamental Rule 81, with effect from the 1st November 1924.

The services of Major R. E. Flowerdew, M.B., I.M.S., are placed permanently at the disposal of the Government of Burma, with effect from the 28th May 1922, for employment in the Jail Department.

The services of Major R. B. Seymour Sewell, I.M.S., Surgeon Naturalist, Marine Survey of India, are placed at the disposal of the Department of Education, Health, and Lands, for appointment as Director, Zoological Survey of India.

The services of Captains J. B. Vaidya, M. M. Khan, and A. J. D'Souza, M.C., I.M.S., are placed temporarily at the disposal of the Government of Madras, with effect from the dates on which they assume charge of their civil duties.

The services of Captain P. Verdon, I.M.S., are placed permanently at the disposal of the Government of Madras, with effect from the 27th February 1925.

Captain A. C. Craighead, M.B., I.M.S., an officer of the Medical Research Department, is placed on special duty under the Indian Research Fund Association for work in connection with the Kala-azar Commission with effect from the date on which he assumes charge of his duties.

The services of Captain A. H. Harty, I.M.S., are placed temporarily at the disposal of the Government of Bombay for employment as Superintendent, Central Mental Hospital, Yeravda, with effect from the date on which he assumes charge of his duties.

Captain R. Hay, I.M.S., is appointed to officiate as an Agency Surgeon, and is posted as Agency Surgeon in Bundelkhand, with effect from the 3rd July 1925.

The services of Captain S. L. Mitra, I.M.S., are placed temporarily at the disposal of the Government of Bihar and Orissa, with effect from the date on which he takes charge of his civil duties.

The services of Captain E. R. Daboo, M.C., I.M.S., are placed temporarily at the disposal of the Government of Assam, with effect from the date on which he assumes charge of his duties.

LEAVE.

Colonel C. H. Bensley, C.I.E., K.H.P., I.M.S., Inspector-General of Civil Hospitals and Prisons, Assam, is granted 8 months' leave on average pay, with effect from the 1st July 1925.

Lieutenant-Colonel A. Leventon, I.M.S., Superintendent, Campbell Medical School and Hospital, Sealdah, was allowed leave for 2 years, 1 month and 16 days from 11th March 1923 to 26th April 1925, viz., leave on average pay for 6 months and 5 days, under Rule 81 (b) (i), Fundamental Rules, and leave on half average pay for the remaining period under Rule 81 (d) of the said Rules.

Lieutenant-Colonel R. F. Standage, C.I.E., I.M.S., an Agency Surgeon, is granted leave on average pay for 6 months and 4 days combined with leave on half average pay for 26 days, under Fundamental Rule 86, with effect from the 29th July 1925.

PROMOTIONS.

Lieutenant-Colonel (now Colonel) R. W. Knox, D.S.O., M.B., F.R.C.S., I.M.S., to be temporary Colonel from the 23rd November 1918 to 11th November 1919, whilst employed as Assistant Director of Medical Services in Egypt.

Lieutenant-Colonel C. Hudson, C.I.E., D.S.O., I.M.S., to be Bt.-Colonel, with effect from the 1st July 1925.

Majors to be Lieutenant-Colonels.

Harry William Pierpoint, F.R.C.S. Dated the 1st August 1925.

William David Henderson Stevenson, C.I.E., M.D. Dated the 1st August 1925.

Henry Patullo Cook, M.B., F.R.C.S.E. Dated the 1st August 1925.

Percy Strickland Mills, M.B. Dated the 1st August 1925.

William James Fraser, M.B., F.R.C.S.E. Dated the 1st August 1925.

Charles Aubrey Godson, M.C. Dated the 1st August 1925.

Reginald Henry Lee, M.B. Dated the 1st August 1925.

Frank Phillips Warwick, D.S.O., M.B. Dated the 1st August 1925.

William Anderson Mearns, M.D. Dated the 1st August 1925.

Robert George Gibbon Croly, M.B. Dated the 1st August 1925.

Captains to be Majors.

George Henry Mahony, M.B. Dated the 31st July 1925.

Gordon Covell, M.D. Dated the 31st July 1925.

William Ross Stewart, M.B., F.R.C.S.E. (Bt. Major). Dated the 31st July 1925.

Venkatasubba Mahadevan, F.R.C.S.E. Dated the 31st July 1925.

Alured Charles Lowther O'Shee Bilderbeck, M.B. Dated the 31st July 1925.

The promotion to present rank of Major R. Sweet, D.S.O., M.B., I.M.S., is antedated from the 25th January 1925 to 25th July 1924.

Captains to be Majors.

James Findlay, M.B., I.M.S. Dated the 26th July 1925.

William Collins Spackman, M.B., I.M.S. Dated the 26th July 1925.

Manulal Maganlal Mehta, I.M.S. Dated the 26th July 1925.

Charles Henry Powell Allen, I.M.S. Dated the 26th July 1925.

NOTICE.

RADIOGRAPHY IN INDIA.

THE practice of radiography calls both for the services of a specialist and efficient apparatus. The latter is particularly important in India, where the distance from the factory and climate conditions render it imperative that only material of the finest quality be installed.

The specialist is at all times dependent upon the efficiency of his plant and the co-operation of the manufacturer in supplying apparatus that is fully capable of giving consistent results throughout its entire field of application. If the equipment fails to fulfil this object, it at once sets up difficulties for the radiographer and in India where one is more often solely dependent upon the services of a local electrician, these small faults frequently develop into serious troubles and at times terminate in a total break-down.

The qualities inherent in a first-class installation fall mainly under the headings of design, operation and durability.

The design of X-ray equipment, fundamentally, must be based on the soundest electrical and mechanical principles.

From the point of view of the radiographer it is necessary that the layout of the equipment shall have been given careful and expert consideration, and shall be in accordance with the most up-to-date practice. The apparatus itself must combine simplicity with ease of control and at the same time be capable of giving consistent and reliable results.

With the object of giving a really efficient service to radiologists in India, the International General Electric Company, Inc., have now established at their Ballard Estate address, Bombay, a department for the supply of all forms of X-ray and electro-therapeutic apparatus manufactured by the Victor X-ray Corporation, U. S. A. The staff of the X-ray Department of the International General Electric Company, Inc., will be pleased to reply to all enquiries—technical or otherwise—and furnish proposed layouts, quotations and suggestions regarding new plants.

Radiographers throughout India, Burma, and Ceylon, etc., are invited to communicate their address to the International General Electric Company, Inc., when the Company will be pleased to forward periodically, copies of their publications and their regular publication *Service Suggestions*. The offices of the International General Electric Company, Inc., will be found in the advertising columns of this paper.

HILTON & CO.

This firm has now been taken over by Surendra Nath Ghosh who will carry on business at 109, College Street, Calcutta as heretofore.

Publishers' Notice.

SCIENTIFIC Articles and Notes of interest to the profession in India are solicited. Contributors of Original Articles will receive 25 reprints *gratis*, if asked for at the time of submitting their manuscripts.

Communications on Editorial Matters, Articles, Letters and Books for Review should be addressed to THE EDITOR, *The Indian Medical Gazette*, c/o Messrs. Thacker, Spink & Co., P. O. Box 54, Calcutta.

Communications for the Publishers relating to Subscriptions, Advertisements, and Reprints should be addressed to THE PUBLISHERS, Messrs. Thacker, Spink & Co., P. O. Box 54, Calcutta.

Annual Subscription to "*The Indian Medical Gazette*," Rs. 16 including postage, in India. Rs. 18 including postage, abroad.

Papers and articles forwarded for publication are understood to be offered to the *Indian Medical Gazette* alone, and any breach of this rule will be followed by non-publication.

The Editors of the *Indian Medical Gazette* cannot advise correspondents with regard to prescriptions, diagnosis, etc., nor can they recommend individual practitioners by name, as any such action would constitute a breach of professional etiquette.

Original Articles.

CHRONIC OSTEOMYELITIS IN LONG BONES.

By H. HALLILAY,

LIEUTENANT-COLONEL, I.M.S.,

Civil Surgeon, Simla.

In this country chronic bone disease, excluding that associated with syphilis, tubercle, new growth and mycetoma, commonly presents itself to the surgeon in one of two forms.

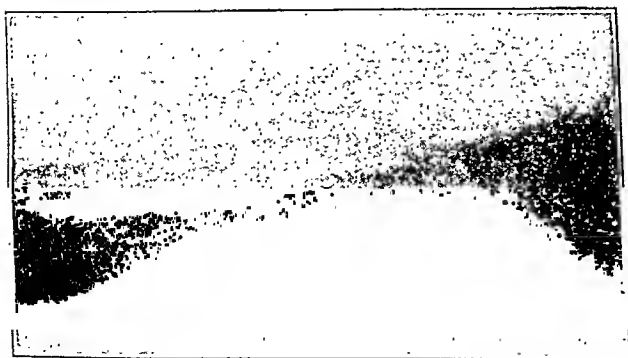
1. Massive necrosis of the whole or part of the original shaft which is enveloped in new bone with suppuration and sinus formation. This form is due to an attack of acute osteomyelitis, of which it is the sequel; it may be a source of intense suffering and discomfort to the patient and is liable to end in death from amyloid disease and exhaustion.

2. A chronic overgrowth and sclerosis of the shaft of the bone with or without the formation of sinuses. In this form there may be no outward sign of the sepsis which is lying in the heart of the bone, no sinuses, and no recurring abscesses which are so common in the first form.

Sequestrum formation may occur in this form varying in size from tiny spicules to quite considerable fragments.

The outstanding feature of both these varieties clinically is chronicity; they may persist for years, from early childhood to adolescence and from adolescence far into adult life until a more than usually severe exacerbation of sepsis or the onset of amyloid disease ends the patient's troubles by cutting short his or her life.

These cases are, from the actuarial point of view, "bad lives"; they have an enemy within the gates, always ready to seize an opportunity for the undoing of the host.



The history of such cases is a depressing one; it is usually a record of continuous or intermittent suppuration from a persistent sinus or sinuses alternating with the recurrence of acute trouble followed by operation and inevitable disappointment. After one of these interludes of pain,

insomnia and fever the flow of pus resumes the silent tenor of its way.

Many of these mournful legends are illustrated by pathetic ossuaries, fragments of necrosed bone which the sufferers have collected as melancholy souvenirs of epochs of intenser suffering in a life-time of discomfort. They will relate how on this, that or another occasion the bone was "scraped." Some of these scrapings were so obviously futile that the listener is reminded of Sidney Smith's famous reply to the little girl who told him that she was stroking her pet tortoise on its shell to tickle its back. He said, "You might as well stroke the dome of St. Paul's Cathedral to tickle the Dean and Chapter."

The surgical problem is the obliteration of a septic cavity with rigid walls. Some have attempted to solve the problem by adopting the methods employed by a dentist when dealing with a carious tooth, by filling the cavity with an amalgam of metals, or by the use of a decaieified sponge. Others have poured hot antiseptic pastes into the cavity; these set solid on cooling. Others again endeavour to effect the obliteration of the cavity by means of pedunculated grafts of muscle, a procedure obviously doomed to failure in the presence of any residual sepsis in the cavity.

The success attending these methods has been on the whole mediocre, but they have all one aim in common, viz., the obliteration of the bony cavity.

The method to be described here has this same object in view but attains it not by the introduction of a foreign body into a cavity, but by converting the cylinder of bone into a lath, nothing but the posterior thickness of the shaft being left. The free removal of all overhanging fragments permits the periosteal sleeve to collapse upon the residual strut of bone. New bone is rapidly laid down from the contiguous surfaces of bone and periosteum.

TECHNIQUE.

The conservation of the periosteum is essential in this operation. The incision is made on the surgical aspect of the bone, down to the bone through the periosteum for the whole length of the diseased area. If on exposing the bony cavity the disease is found to extend beyond the limits of the incision it should be extended in the same line, the periosteum being incised down to the bone.

The periosteum is then carefully separated from the bone with a rougine which should have a chisel edge of razor-like sharpness, so that an abundant supply of bone cells from the cambium layer is elevated with the periosteum. The subsequent rate of repair will be directly influenced by the care with which this operation is carried out.

The periosteum is separated up to the limits of the bone which it is decided to retain, always bearing in mind that it is essential to continue

the removal of bone until nothing is left but the two plane surfaces of the posterior aspect of the shaft.

With ordinary care, by working within the periosteal sleeve, the danger of damage to soft parts is negligible; with an adequate incision an ample exposure is secured and nothing need be done in the dark.

With all these operations for chronic sepsis in long bones free exposure and a good light are indispensable, for, if a focus of sepsis is overlooked the success of the operation may be jeopardised.

As soon as sufficient bone has been stripped of its periosteum the cavity of the shaft is opened by suitably planned cuts into the bone.

This may be done by an Allbee's saw or with chisel and mallet as desired. The electrically-driven saw saves much time and labour, but the necessary trimming of the shaft may be effected with chisel and gouge.

The surface of bone which remains is carefully scrutinised for areas of necrosis, sinuses, or actual perforations and all diseased tissue is energetically removed.

It should next be ascertained how far the periosteum and attached soft parts will glide in over the remains of the shaft.

Any projections interfering with this should be removed as it is important to reduce the number of dead spaces to a minimum.

When the operative area is in the neighbourhood of a joint great care must be exercised to avoid damage to the articular cartilage and the removal of bone should be so planned as to avoid too steep a descent.

This is particularly necessary when dealing with the tibia as if too steep a gradient is allowed it will be difficult to get the raw surface of the bone covered by the flaps of soft tissues and periosteum.

When all the diseased tissue has been removed we have a sort of keel of bone to which is hinged on each side of a flap of periosteum originally covering half the expanded shaft and preserving its original connections with the soft parts in relation to the bone, and in consequence maintaining its blood supply intact. These flaps are united in the line of the original incision by interrupted silk-worm-gut sutures. This brings about the abolition of nearly all the dead space, any gap left at the upper extremity of the incision being plugged with gauze and allowed to fill up from the bottom.

If all the diseased tissue has been removed such cavities will become obliterated by a vigorous growth of close, healthy granulations and no more discharge will come away than is usual with any other healthy granulating surface. Increase of or persistence of discharge means some undetected focus of caries or recrudescence of caries in some part of the bone; this indicates subsequent minor operative interference.

The following cases will illustrate the results of this method; if the solidity of the residual

shaft of bone permits it the patient should be allowed upon his feet as soon as the wound is soundly healed or earlier if there is any delay in healing. Use is the best stimulus to bone growth.

To secure rapid healing and the best results the surgery must be very bold and radical; half-hearted operations are better left undone.

Illustrative cases.

Case 1.—P. S., aged 28. Duration of disease 1 year. Admitted on May 2nd, 1923. History of much pain and disability in the leg.

Operation.—June 10th, 1923. Great thickening and sclerosis of bone and caries in medullary canal extending nearly half the length of the shaft. Complete operation. Removal of all but a lath of bone so as to leave no overhanging edges; the separated leaves of periosteum came into good contact with the denuded bone. Convalescence was uneventful; there was abundant formation of new bone. The wound healed by first intention and the patient was discharged on July 28th, 1923.

Days in hospital after operation—49 days.

Case 2.—I. D., aged 22, admitted into hospital on July 3rd, 1923, with chronic osteomyelitis of the right tibia and leg riddled with sinuses. Duration 10 years.

Operation.—July 9th, 1923. Complete operation. Bone greatly sclerosed and thickened, rarefying osteitis, pus, no massive necrosis and no involucrum. All bone removed in anterior and lateral aspects, only a lath of bone left; the periosteum was carefully conserved. One small secondary operation was found to be necessary. The lower half of the wound healed by first intention but there was a small cavity left at the upper end which was not quite healed when the patient left hospital in October.

Stay in hospital after operation—86 days.

Case 3.—H. S., aged 12 years, admitted into hospital on July 30th, 1923, with much discharge, massive necrosis and involucrum.

Operation.—July 31st, 1923. Complete removal of all but the posterior layer of involucrum, cylinder of necrosed shaft removed,—it was lying free in the cavity of the involucrum; the periosteum came into good contact with the denuded area. The lower half of the wound healed by first intention but a cavity was left in the upper half which was plugged daily with plain gauze and granulated up. The patient was discharged on 24th September, 1923.

Stay in hospital—56 days.

Case 4.—J. R., aged 12, admitted into hospital on June 4th, 1923, with chronic osteomyelitis of the left tibia. Duration six months. Foul and copious discharge; general health very poor.

Operation.—June 12th, 1923. Removal of sequestra, all but the posterior part of the bone removed; periosteum in good contact with denuded area in lower two-thirds of the wound. Cavity left in upper third which was plugged. Discharge persisted so the wound was explored on August 21st, 1923, and a large piece of old necrotic bone was found under an overhanging ledge of bone; this was chiselled away, the piece taken away and all granulations were removed at the same time. The wound was packed with gauze and securely healed in its entire extent by November 10th, 1923. General condition much improved.

Stay in hospital—152 days.

Case 5.—A. H., aged 15. Chronic osteomyelitis of the left ulna. Duration 1 year. Ulna border of the arm was riddled with sinuses.

Operation.—July 10th, 1923. Large sequestrum, round, rather patchy involucrum, many sinuses; periosteum came into good contact with the denuded surface of the bone. The patient was discharged on August 29th, 1923, with good formation of bone and wound soundly healed.

Stay in hospital—50 days.

SOME POINTS IN THE ARTIFICIAL FEEDING OF INFANTS.

By E. H. VERE HODGE, M.B.,

MAJOR, I.M.S.,

Surgeon to H. E. The Governor of Bengal.

TAKE a child off the breast prematurely and his troubles begin. This is perhaps even more true in India than elsewhere. One is constantly seeing sick infants and hearing one story about them, that they thrived for three or four months on the breast but as soon as they were bottle-fed they lost weight and became sickly; cow's milk and all sorts of proprietary foods were tried in turn (without reference to their composition), but without success. It is the frequent repetition of this story that emboldens the writer to endeavour to summarise the generally accepted views on the values and methods of use of the available substitute foods. It is not unnatural that the lay public should seek to simplify the feeding of their infants by recourse to proprietary foods; modern advertisers are persuasive and persistent, the mother, with the virtues of some patent food constantly before her eyes, is apt to forget the fresh milk of the cow, the virtues of which are not broadcasted from every hoarding. Advice is sought and opinions so freely expressed as to the virtue of this or that food that it is well to form a balanced judgment of the relative values and defects of the two classes. Neither class is ideal, but it is only fair, when criticising proprietary foods to remember that we are comparing them with another substitute for the human infant and to bear in mind, on the one hand the defects of cow's milk and on the other to be certain that the results of misuse are not prejudicing us against patent foods.

By proprietary or patent foods, for the purposes of this article, some preparation of cow's milk whose sugar content is not higher than that of human milk, is understood, as it is only in selected cases of malnutrition that malted foods are admissible and even then their use is to be limited to the shortest time possible. This being the case, it is evident that both classes have faults in common, such as high protein content, deficiency of fat and resistance to digestion as compared with human milk. As regards digestibility, milk powders appear to have a slight advantage.

There are other faults, metrically minute, but nevertheless having far-reaching influence on metabolism.

Cow's milk containing, as it does, an excess of mineral salts neutralises a higher proportion of the acid of the gastric juice than does human milk. The practice of adding citrates to the milk will still further accentuate this fixing of the available acid, and the wisdom of such radical interference with the digestive cycle at its inception is debatable. True, the coagulability of the milk is reduced by the action of the citrates, which render some part of the calcium content not available, but at the same time the essential

hydrochloric acid is reduced, protein digestion is delayed, and the stimulus to the next link in the digestive chain is likely to be adversely affected.

Dunham (1925) on the contrary advises the acidification of milk with cider vinegar and claims to have had excellent results not only in normal children but in conditions such as pylorospasm which present grave difficulties. The writer having had no experience of this is unable to constitute himself an advocate but, on the same principle, has added small quantities of mineral acid to the feeds of infants when it seemed that the whole digestive tract was in a state of suspense for want of an initial stimulus; the results were encouraging.

Apart from interfering with digestion, any measure which tends to weaken the acid barrier of the stomach, already unstable in infants, is to be deprecated as opening the path to invading microbes.

A further defect is the low proportion of lecithin, an important constituent of brain and nerve tissue, and presumably required in the amount supplied by Nature. Fortunately this can be replaced by giving lecithin, one grain daily, until such time as the infant is able to digest egg-yolk.

To this point we have dealt with cow's milk at its best, that is, dairy milk from pasture-fed cows collected with scrupulous cleanliness, and with the faults common to it and to dried milk.

Of fresh milk there are still two sources, purchased milk or milk from the privately owned cow. The first is unthinkable, it would be necessary to autoclave it to make it safe; the second, though in the main satisfactory, must be subject to certain precautions. Firstly, the cow must be healthy and, if possible, tested with tuberculin. In view of the possibility of tuberculosis some authorities recommend the keeping of goats; secondly, the milk varies at different stages of lactation and a good fat content must be assured; thirdly, an important point is that the milk is liable to deficiencies in those very properties which are the reason for its election instead of dried milk.

The investigations of Dr. E. M. Luce (1924) into the effect of feeding and sunlight on the vitamin content and growth-promoting factors in milk have peculiar application to India. Incidentally she has suggested that the antirachitic and growth-promoting factors are separate entities and vary independently of each other, but the point which really concerns Indian milk is that both growth-promoting and antirachitic factors are poor when the cow is fed on dried fodder. This being the case, it is inconceivable that the plain-dwelling cow can be efficient in these properties in the hot weather.

In brief, many of the defects of artificial foods are also to be found in cow's milk and it is only the cow's milk of certain favourable conditions which can be held to be superior to the

dried substitute. At the same time, there can be little doubt that cow's milk of good quality offers the best substitute for human milk; it is easy of modification to something approaching breast standard by adding cream and sugar or by having recourse to the top-milk method. Further, it can be peptonised when the condition of the infant requires it.

The case for dried milk is that it is a clean food, easy to prepare and keep clean, constant in its proportions and reasonably easy to digest. Recent experiments have established the nutritive value of dried milk as superior to fresh, at any rate so far as laboratory animals are concerned. (Hartwell, 1925.)

The writer would quote from a well-known text-book by Dr. Eric Pritchard on "Physiological Feeding of Infants and Children."

"If a group of independent observers would take a series of infants and would feed them on dried milk modified to breast standard, and would comply with all other physiological conditions, I am perfectly certain that they would come to the same general conclusion that I have come to after fifteen years' experience in the management of nearly 3,000 infants fed exclusively on dried milk, namely, that if this method does not give as good results as any other method, it is not the fault of the milk but of the manner in which it is used."

There can be little question that proprietary foods are more often misused than not. Full directions are usually issued by the makers and one is inclined to think that they do their products an injustice by claiming too much for them. The common recommendation is that the baby from birth shall be fed on what is really the equivalent of cow's milk. If the baby thrives it is an accommodating baby and deserves the not infrequently earned distinction of having its photograph in the papers.

The grosser defects of cow's milk have been dealt with above, and these obviously apply with equal force to dried milk. Calculations from the standard tables issued with the food reveal a caloric value markedly below the requirements of the infant. Nowadays there are few adherents of the whole milk method of feeding, and it is unreasonable to invest dried milks with virtues not possessed by fresh milk.

Dried milk, therefore, requires the same careful modification that fresh milk does. It is now held that in dried milk vitamins *A* and *B* are present in sufficient quantities and that vitamin *C* is absent. At the same time, it is well to guard against a shortage by adding a small quantity of cod-liver oil as well as fruit juice to the diet. Failing these, as some infants seem incapable of digesting either, Metagen (Parke, Davis) will be found an efficient substitute.

To recommend the addition of cream to dried milks does not seem the soundest sense, as where there is good cream there also will be reliable milk, but the deficient fat may be made up satisfactorily with an artificial cream, such as that made from

peanut oil, which is issued daily in large quantities by the Great Ormonde Street Hospital.

Sugar must, of course, be added to standard and it is to be remembered, in drawing up diet sheets, that the caloric requirements of infants in the plains are markedly lower than those of the same infants in a cold climate.

In conclusion, the writer, while disclaiming an advocacy of dried milks as superior to fresh milk, would maintain that, where the milk supply is not above reproach, it is better to have recourse to dried milks from which satisfactory results may be expected, provided they are used with due appreciation of their constitution and of the physiological requirements of infants.

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EXTRA-UTERINE GESTATION GOING TO TERM WITH A LIVING MOTHER AND CHILD.

By P. S. MILLS, M.B.,

LIEUTENANT-COLONEL, I.M.S.,

Civil Surgeon, Gaya.

A WOMAN, aged about 20 years, a Gwalah by caste, was admitted to the Pilgrim Hospital, Gaya, on 13th March, 1925, with the history that she had arrived at term of her first pregnancy, and that she had been in labour for three days.

The village midwives had done all they could, and as delivery did not take place, sent her to the Pilgrim Hospital, about 12 miles away, for treatment.

She was a sturdy and healthy woman, and menstruation had been regular until nine months previously, since when there had been complete amenorrhœa.

On admission it was found that there was a foetus in the abdomen, lying transversely with the head to the right. The remainder of the parts of the foetus could not be made out, and there was nothing in the abdominal signs to suggest ectopic gestation. The head was not more easily felt than normally. Foetal heart sounds could not be heard, but foetal movements were felt, although they were not very active.

Examination per vaginam showed a thick reddish-brown discharge in which were fragments of proliferated endometrium. It was not like the healthy red blood seen at the first show at the beginning of labour, but was much thicker, doubtless due to the shedding of the uterine decidua with the false labour that had been on for three days.

The cervix admitted two fingers, and the uterus could be made out lying somewhat to the right and about twice the size of the non-pregnant organ. Ectopic gestation was diagnosed.

The woman's general condition was very good, and it was difficult to believe that she had been in labour for three days.

Laparotomy was performed at once and it was found to be a broad ligament pregnancy on the left side. The sac was extremely thin, and it was surprising that it had not been ruptured by the manipulations of the native midwives. There were no adhesions and a live female child was extracted without difficulty. The pedicle was tied and the sac with placenta removed. The placenta was lying in front and to the left side, obscuring the back and breech of the child.

The mother unfortunately developed an abscess in the cellular tissue of the left side, but the pus was evacuated into the vagina and drained; she thereafter made an uninterrupted recovery.

The mother and the child left hospital well on 21st April, 1925.

There are a few points in connection with this case, and with ectopic gestations generally, which Major P. Fleming Gow, I.M.S., of the Eden Hospital, Calcutta, has been kind enough to point out. I quote them below:—

1. The age of the woman—20 years—is rather more than is common for a first pregnancy in the village class in India, suggesting the most common ætiological factor in ectopic gestation, viz., preceding inflammatory disease of the tubes, but there was no evidence of such in this case.

The appendages on the right side were healthy; on the left side they were removed with the sac. The left tube was elongated to 14 inches, 10 inches of which were attached to the margin of the placenta and the last four inches, with the abdominal ostium, were free of the placenta. The left ovary was healthy; no enlargement suggestive of a corpus luteum was made out in the right ovary.

In some cases of extra-uterine gestation it has been found that the corpus luteum is situated in the opposite ovary, indicating external migration of the ovum; there was no evidence of such in this case.

2. In broad ligament pregnancies the foetal parts can usually be made out with abnormal ease. In this case it was not so, and this is accounted for by the fact that the placenta obscured the body and breech of the infant.

3. The pedicle in this case was at the left cornu of the uterus and did not involve other parts, the placenta being quite separate from all the organs except the left tube. This made the operation a very simple one. The gestation was undoubtedly one originating in the proximal two inches, i.e., in the isthmus of the tube, the foetus burrowing downwards between the layers of the broad ligament, with the placenta remaining attached to the interior of the tube.

4. It is not infrequent for menstruation to continue for some time during an ectopic pregnancy, but in this case there was complete amenorrhœa.

5. It is not often that an extra-uterine foetus has such a happy fate. It is frequently absorbed while within the fallopian tube, and Mall has calculated that not more than 1 per cent. of all extra-uterine pregnancies will reach full term.

When the foetus has survived rupture of the tube, the diagnosis of broad ligament pregnancy is rarely made until false labour occurs, particularly so in India where there is so little ante-natal care. When false labour does set in, it is soon followed by the death of the child; this would certainly have happened in this case had laparotomy not been done without delay after the admission of the patient to hospital. Prompt laparotomy is the only real conservative treatment for unruptured extra-uterine pregnancy, since rupture may occur at any time and the patient may die before operative assistance is available.

It is only in very rare cases, however, that a normal living child is delivered from between the layers of the broad ligaments, and the operation in this case was comparatively easy as the foetal sac was free from adhesions and the placental site almost wholly within the tube.

It should be remembered that the removal is not always so easy, and if the placenta is spread over a broad area it may be better to marsupialise the sac and allow the placenta to separate piecemeal. If the placenta is partly separated it has to be removed, and if in removing the sac the uterus also has to be removed, the patient may die of hæmorrhage.

According to Whitridge Williams, the after-history of these cases is not abnormal, for the Johns Hopkins' statistics show that 38 per cent. of patients who, after an ectopic pregnancy, were left with a uterus, one ovary, and one tube, later became pregnant and were delivered at term of healthy children.

SALIENT POINTS ON SUPRAPUBIC PROSTATECTOMY AT ONE SITTING.

By M. D. DAVID, M.B., C.M., F.R.C.S.E.,
Civil Surgeon, Shwabo, Upper Burma.

THIS tabulated statement shows the details of five cases operated upon for enlarged prostate by the suprapubic method. Unfortunately, I was unable to get the first case photographed; the remaining four are represented in the picture.

It is noteworthy that these old men came in with "trivial" complaints, such as slight difficulty in passing urine, burning micturition, hæmaturia or frequency of micturition with chronically dilated bladders of which they were not aware. They usually showed all the signs of auto-intoxication, especially the neglected ones.

The details of method followed in these five cases are as follows:—

They were kept under observation for a week or so, their bladders relieved regularly at intervals of six or eight hours and washed out with potassium permanganate or boric once a day, and after their urine was tested they were treated with urotropin, salol, or benzoic acid, if necessary; their diet was milk and barley.

Photo. I.



Although operation in two stages is the ideal thing to do (i.e. (1), drainage of the bladder suprapubically through Pezzer's catheter; (2), enucleation three weeks later). I cannot persuade my patients to undergo the two-staged operation, simply because they consider that a second one has to be done due to the failure of the first. A preliminary course of calcium chloride grains xv in six to eight doses was given before operation; the bladder was washed out on the operation table; 8 to 12 ounces of clean boric or saline put in through a metal catheter and the bladder opened suprapubically. The bladder cavity was thoroughly explored as to size and shape of prostate, presence of stone, etc. Then with gloved left index finger in the rectum, enucleation was proceeded with by introducing the right index finger into the internal urethral orifice through the wound and scraping the mucous membrane which soon gives way. The lobes are enucleated easily, one by one or the prostate as a whole; if aided by the finger in the rectum, no force is necessary at all. Standing on the side rail of the operation table and leaning well over the patient helps a lot. If the enucleating finger is in the proper line of cleavage, between the prostatic capsule and the prostatic sheath of the pelvic fascia, the lobes shell out very easily indeed without much bleeding. Although the hæmorrhage is pretty profuse and frightening, it easily stops with fairly hot water irrigation either through the wound or

catheter. I have had no necessity to plug this space with adrenalin gauze. The bladder is drained suprapubically with a big-sized india-rubber tubing communicated to a bottle with some lotion, and Retzius' cavity by a separate small, short tube. I have not tried perineal drainage which is bound to do very well, as it will be in the most dependent part and will avoid absorption of foul urine and blood clot. This can be easily done by pushing a long bent forceps into the prostatic space through the wound, opening the perineum on its tip and drawing in a drainage tube. Even if this is done I am inclined to keep the bladder wound open as well with a drainage tube from below. The patient is kept in Fowler's position and the drainage tube discarded on the fourth or fifth day after operation. He is given plenty of fluids, barley, milk, soda, mist, diuretic and urotropin, benzoic acid or salol, etc. The bowels are kept open on the third day. The great thing is to prevent hypostatic congestion of the lungs by getting the patient to get up and get out on to an easy chair as early as possible after the danger of hæmorrhage passes away. In some cases recurring hæmorrhage does come on which may not stop due to the condition of the blood vessels and sloughing of the tissues owing to sepsis and cause the death of the patient. I resort to calcium chloride injections intramuscularly and I must say I have been fortunate to save all my patients, though I have not been able to prevent abscesses forming at the seat of injection even with every possible care and attention. Hæmostatic serum ought to help in such cases, also adrenalin pack after hot irrigation. I can remember an old patient saved in the Rangoon General Hospital with injections of morphia and, at the suggestion of a sister, i.e. rectal injections. He is still living to tell his tale and is a reporter of an important Rangoon daily paper. Personally, I avoid morphia as far as possible in these cases on account of the damaged condition of the kidneys, but I do believe it has to be resorted to when everything else fails to arrest hæmorrhage. After removal of the suprapubic drainage tubes, the wound is carefully and gently irrigated once or twice a day, the dressings changed several times a day, and the patient is encouraged to get about a bit carefully and on to an easy chair. He is allowed to have the food he cares for, augmented by plenty of fluids and barley water. About the 18th to 21st day he starts passing some urine by the urethra and the suprapubic wound rapidly heals up in another week or two and the patient is again as fit as a fiddle.

What has happened in the prostatic pouch is as follows:—First part of the urethra is

replaced by the collapsed fibrous sac consisting of a prostatic sheath of pelvic fascia communicating with the neck of the bladder above and membranous urethra below. This passage is later on lined by mucous membrane growing above from the neck of the bladder and below from the membranous urethra.

The severe cases were those in which the temperature continued very high causing delirium and prostration or were complicated by an underlying lung condition, e.g., pleuro-pneumonia or broncho-pneumonia.

It is in these cases that the drug (iodine) used intravenously has proved so beneficial in our

| No. | Name, nationality and age. | Occupation. | Prominent symptoms and duration. | Date of operation. | Special points about operation. | Course and treatment. | Date of taking out drainage tube. | Date of passing urine by urethra. | Date of discharge. |
|-----|---|-------------|---|--------------------|--|---|-----------------------------------|-----------------------------------|--------------------|
| 1 | Mg. Po Thar, Burmese male, aged 60. | Cultivator. | Burning urine. One year. | 13-3-25. | Phosphatic stone and enucleation prostate. | Severe Haemorrhage (20th-23rd), checked by calcium lactate injections and orally and careful washing. | 20-3-25. | 3-4-25. | 16-4-25. |
| 2 | U. Thi Ka, Burmese male, aged 70. | " | Frequency of micturition. 22 days. | 17-5-25. | Enucleation.. | .... | 22-5-25. | 12-6-25. | 29-6-25. |
| 3 | Mg. Htaw, Burmese male, aged 73. | " | Retention of urine 3 days with dribbling. Two previous admissions into hospital. Had auto-toxaemia. | 3-6-25. | Enucleation.. | .... | 8-6-25. | 25-6-25. | Still in hospital. |
| 4 | Mg. Po Han, Burmese male, aged 58. | " | Frequent micturition with straining and burning. Total 1 year. Bad 15 days. | 11-6-25. | Enucleation. Comparatively small prostate, middle lobe very prominent, bigger than a marble. | .... | 16-6-25. | 17-6-25. | " |
| 5 | Phongyi U. Thamingala, Burmese male, aged 75. | " | Retention of urine 5 days. Attended outpatient department 3 days. Drawn a lot of bloody, offensive urine. | 20-6-25. | Very big indeed. Enucleation. | .... | 25-6-25. | .. | " |

A NOTE ON THE VALUE OF IODINE INTRAVENOUSLY IN THE TREATMENT OF INFLUENZA.

By Asst. Surgeon C. P. V. SHUNKER, I.M.D.,
Superintendent, Central Jail, Bellary.

DURING the month of June 1925, there occurred at this Jail an epidemic of influenza resulting in the admission of 66 cases to hospital within a short period. All the cases were of the typical acute catarrhal variety (respiratory type) of the disease. Twelve cases were complicated by lung conditions, pleuro-pneumonia or broncho-pneumonia. There were no deaths.

My attention having been drawn to the value of iodine intravenously in septic conditions, the method was given a trial in the very severe cases when the usual remedies, e.g., sodium salicylate, cinchona, etc., had little or no effect.

hands. In fact we have been struck by the marked improvement in the general condition of such patients. Within 24 hours of the injection most of the patients passed from a condition of anxiety and distress into one of comparative comfort.

There is no danger attached to the method if the usual precautions are taken. The formula used was that of Dr. Chaudhuri as advocated by him in the *Indian Medical Gazette* for February, 1925, but instead of 3 to 6 minims as a dose, 20 minims were given in 10 c.c. of saline as the initial injection. If the temperature and general condition do not improve a second injection of 40 minims diluted to 10 c.c. of saline is administered generally within 48 hours.

In our series most of the cases were greatly benefited by one injection. Some of the more serious cases required a second and even a third

injection, while one case—the most serious of all that we had—received five injections.

Formula:—

| | |
|----------------|-------------------|
| Iodum | .. 1 drm. |
| Pot. Iodide | .. 1 drm. |
| Aq. distillata | .. 5 ozs. 2 drms. |

The iodine is dissolved in the solution of potassium iodide in distilled water, previously prepared.

Roughly, 20 minims of the above solution contains $\frac{1}{2}$ grain of iodine.

Initial dose. 20 minims ($\frac{1}{2}$ grain iodine).

Second and subsequent doses. 40 minims (1 grain iodine).

THE MOSQUITO FACTOR IN THE MALARIA OF ASSAM TEA GARDENS.

By C. STRICKLAND, M.A., B.Ch.,

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INTRODUCTION.

THE main object in here reproducing this paper which was read before the Assam Branch of the British Medical Association at its Jorhat Meeting on March 2nd, 1925, is to publish it with the illustrations which were given by lantern and to correct a few minor misapprehensions thereanent which have arisen.

The subject was the conclusions arrived at from a mosquito malaria survey of the tea gardens of Assam which the Endowment Fund of the School of Tropical Medicine was enabled to finance by the generous help of the Indian Tea Association. Further study of the detailed observations which have only recently been concluded may of course oblige us to modify the opinions expressed here, but in the meantime they are submitted for "necessary action."

I wish to repeat here that I owe a great deal to Lieutenant-Colonel J. W. D. Megaw, I.M.S., Director of the School of Tropical Medicine, for his sympathetic administration of the work undertaken, and to the officers and members of the Indian Tea Association for their help in every way. The work would have been impossible had it not been for the acceptance of the spirit of the scheme by the Medical Officers of the tea estates, for they placed all information at my disposal and every possible facility for collecting the data which I required.

THE ADVANTAGES OF A SURVEY.

While a malaria-prevention campaign without a previous survey can indeed be carried out by employing certain measures which are of general application, a survey has three advantages, enabling one to (1) find out if a healthy site be available; (2) localise the area in which prophylactic measures should be taken; and (3) choose the most appropriate measures to deal with the situation. The last item is very important because some anti-malarial methods not

being of general application might, if tried without knowing what situation is being dealt with, cause worse trouble. Take for instance, open earth-drainage; one drains a swamp and eradicates the species *umbrosus*, one drains another and introduces *maculatus* or *funestus*. In this connection Boyd says "all anopheline mosquitos are not carriers of the malaria parasites, and gross variations with regard to breeding habits are found among the different species of anophelins. Thus, it often happens that in a mosquito-infected district where malaria is occurring, only a small portion of the total mosquitos are of the carrier type, and these may have quite specialised breeding habits, so that general measures of mosquito destruction might miss them altogether. The first essential in any district is, therefore, to make a critical survey to ascertain what mosquitos are carrying the parasite and what their breeding habits are; after which, if feasible, steps specifically directed against the carrier species may be undertaken. To illustrate the diversity of breeding habits the following instances may be quoted:—*Anopheles maculipennis*, a well-known carrier, breeds chiefly in swamps and marshes and does not breed in running water, so that it can be attacked by draining the swamp. Conversely, *A. maculatus*, which gave rise to much trouble in the Federated Malay States, breeds in running water. Other things being equal, therefore, draining by open drains (the usual method) would not abolish but rather encourage the breeding of this species. Yet another, *A. stephensi*, is almost exclusively a well-breeder and can only be countered by screening or oiling the responsible wells. It can thus be seen that haphazard measures are almost bound to involve a waste of time and money, and may even render the last state of affairs worse than the first by taking away conditions under which harmless mosquitos were breeding and replacing them by others suitable to the propagation of carrier species" (1924).

On the same subject Sir Ronald Ross at a meeting of the Royal Society of Tropical Medicine (1924) stated how different species of mosquitos must be dealt with in different ways. He said "We must deal with each species on its merits"; to which dictum Major Austin agreed, and Dr. Ballfour and Major Austin both were of the opinion that it was necessary to make careful biological investigations before starting upon any anti-malarial campaign. Watson (1924) in this connection said, "Let me candidly admit that for some years we cleaned up the ravines in our hill-land in Malaya making the malaria worse. We had to adopt an entirely different method. Let me remind you too that in 1901 when the Federated Malay States Government gave me the money to clean up Klang, Dr. Braddon applied for money to clean Seremban, a town on the main range. Presumably he would have felled jungle and "trained" streams, and would have caused a big outburst of malaria in, at that time, a healthy

town. Had that occurred I can imagine the progress of malaria prevention in the Federated Malay States would have been seriously retarded as it has been in India by the experiment done in Mian Mir."

The fact that Watson started to preach this doctrine of the specific prevention of malaria in 1911 and that it is still necessary in 1925 for the Society of Tropical Medicine to reiterate it seems rather lamentable.

It will, however, be seen how important it is to do a preliminary survey. As Dr. Murphy of Sylhet has said very concisely "to obtain the most successful results with the most economical expenditure it is necessary that a preliminary detailed survey should be carried out."

PREVIOUS SURVEYS IN ASSAM.

From time to time other surveys than that which is the subject of the present paper have been conducted in Assam. Not all of them have been in tea-garden tracts, but I have included a consideration of some of them in this paper because of the general similarity of the terrain described with that of the tea gardens.

These surveys have been made at Lunding Junction by many medical officers in co-operation, the report being published by Lieutenant-Colonel T. C. McCombie Young, I.M.S. (1921); at Nalbari, Kamrup District, reported by Lieutenant-Colonel S. R. Christophers, I.M.S. (1922), Lieutenant-Colonel McCombie Young I.M.S., and Captain B. S. Challam (1923); at Pasighat by Lieutenant-Colonel McCombie Young, I.M.S. (1921); and lastly, at Doom Dooma by Sir Malcolm Watson (1924). An analysis of these reports has been made in conjunction with the data collected in my survey and details will be noticed below.

THE MOSQUITOS OF ASSAM.

Of the 42 known Indian and Malayan anophelines 15 have been found in Assam and of these 6, because of what is known of their activities elsewhere, must be on their face value suspected and will be the only ones considered here; with regard to some of the others, however, a mental reservation might be held pending further information.

The six are:—*umbrosus*, *jeyporiensis*, *aconitus*, *funestus*,* *culicifacies*, and *maculatus*.

A. UMBROSUS.

This species was one of those responsible for so much trouble in Malaya before Watson showed how to deal with it. We now know it is very easy to tackle; rough open earth-drainage, even through the jungle, is sufficient to eradicate it. It lives in pools or swamps in the jungle or in densely-shaded places, so that by merely cutting down the shade one becomes rid of it.

As it can be so harmful, the question arises as to the place it takes in the malaria problem in Assam.

I have caught it in several places in Assam jungles, for instance, in the swampy ground under jungle near to Lokra in the Balipara Frontier Tract, (fig. 1), and I have no reason to suppose it is not to be found in all similar situations.

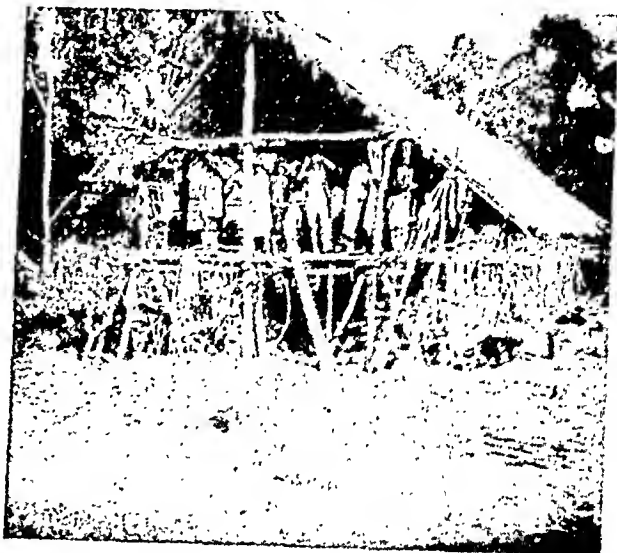


FIG. 1.—*Daphla chang* in the jungle near Lokra.

But does it do any harm? I agree with Watson that in gardens which are well cleared such as in the Doom Dooma district the species is perhaps of no importance, nevertheless it is significant that of the estates along the Dibru or similar rivers, which he mentions as being so malarious, some are opposite the Dibru Forest Reserve. The evidence of the seasonal incidence of malaria in the gardens is also compatible with this being at least partly due to *umbrosus*, for being a swamp breeder it is probably much increased in numbers during the rains, when malaria is also more prevalent.

At Pasighat which Lieutenant-Colonel McCombie Young, I.M.S., surveyed, *umbrosus* was not incriminated but I am inclined to think on reading his description of the terrain that *umbrosus* may have been partly to blame. It seems to me significant that great improvement in health followed cutting down a belt of jungle 300 yards from the lines.

Then one must note too that at Lunding Junction where all anophelines except some breeding in the bed of a river have been got rid of and the spleen-index reduced from about 80 to 30 per cent., a community of sweepers living near the jungle boundary still have a high malaria-rate and a spleen-index of about 90, so Dr. Leitch tells me.

As a final point I would cite the ill reputation for "fever" that the Nambur Forest has for officers on tour.

In general I would give my opinion that any undrained jungle in relation to tea gardens should be considered dangerous until it has been proved not to be so.

* *A. funestus* = *minimus* and *listoni*.

A. MACULATUS.

McCombie Young in his Pasighat survey determined that *maculatus* was the cause of most, if not all, of the trouble. At Lumding, where it was found breeding in the sandy bed of the considerable river the Horu Langpher (fig. 2),

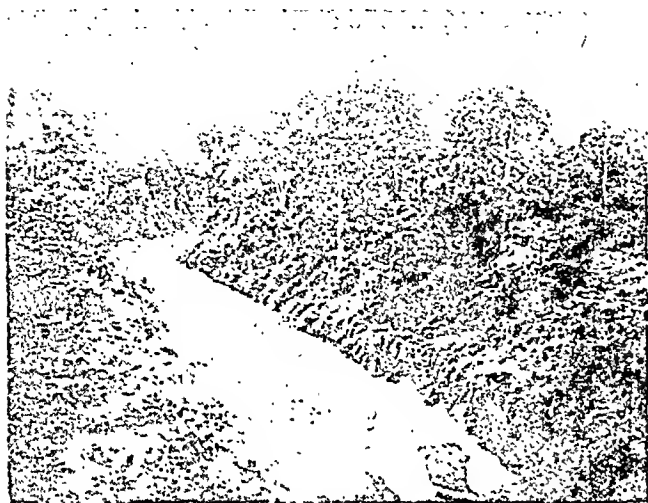


FIG. 2.—The sandy bed of Horu Langpher breeding *A. culicifacies* and *A. maculatus*.

it was not incriminated to the same extent by James, Young, and Fry; and as subsequent anti-malarial measures seem to have eradicated the other species one may conclude that *maculatus*, which still breeds in the bed of the river, is probably responsible for the spleen-index of about 30 per cent. which persists. I am indebted to Drs. Weldon and Leitch for my data.

Challam at Nalbari, in 1920, found no *maculatus*; in 1921, during October and November, a few; and in 1922, after April, some more. He concluded nevertheless that they were not the source of much malaria, in which view McCombie Young concurred. On the other hand, *maculatus* was one of the species which Watson considered to be a dangerous factor in the Doom Dooma gardens. He found it abundantly in January.

I did not find *maculatus* myself very often, only 17 times out of a total of 2,774 catches of all species, and of those most were found in hill-side streams where one would expect the species; however, the paucity of my catch is not surprising when one considers the general lack of suitable breeding places for it in most tea gardens. *A. maculatus* is essentially a stream breeder (fig. 3), or a drain breeder, so that where drains hold spring-water they may be dangerous; it is not a swamp breeder. Watson says, *A. maculatus* lives in the purest water, so it is found in hill-streams, springs at the foot of the hills and banks, and in *bhils*. It is never found out in large flat *pathars* (rice-fields) away from hills, but in narrow valleys in the hills; it may be found in the small *pottahs* or areas which are irrigated by clean water. It is highly sensitive to pollution, or its food is, for even daily washing of clothes at the

head of a small valley will drive the insect from the main stream."

With regard to Watson's conclusion that the species must be regarded as one of the chief causes of malaria in the Doom Dooma gardens, it must be remembered that he found it in the months January to March, and as this is not the malaria season its connection with *maculatus* must still be proved. No observer has yet reported it during the malaria season.

Watson says; and I agree, that the species is to be found breeding in pools in the beds of big rivers like the Brahmaputra, but that "big rivers as a rule are not associated with malaria": which proves that the mere fact of finding *maculatus* in any place is not evidence of any connection with malaria there.

The species having such a liking for seepage water is an additional argument against it being very prevalent in Assam or causing much trouble, for the land is generally low-lying and there is not much seepage; what there is will be found



FIG. 3.—*Maculatus* is a stream-breeder.

where the land is more hilly as in Cachar (fig. 4). In such places, in my opinion, it is more likely that *maculatus* is doing harm, although I found no direct evidence of it.

A. CULICIFACIES.

This species has been reported in the Nalbari and in the Lumding survey. At Nalbari it was found in June breeding scantily in rain pools in paddy-fields, but not much importance was ascribed to it. At Lumding it was found by Weldon in large numbers in a tank as well as in pools in the bed of the big river and much of the malaria was put down to it. Unfortunately the season during which it was found breeding was not mentioned.

Watson caught none of the species but in his conclusions thinks that perhaps it is of some importance.

Likewise, during my three months preliminary survey of the tea gardens in 1923, I found none. However there is no inherent improbability that *culicifacies* is a factor in tea-garden malaria. Watson and I caught none because we tried at the wrong season (October to March). The species is a pool breeder like *umbrosus*, so it should be looked for at the advent of the rains

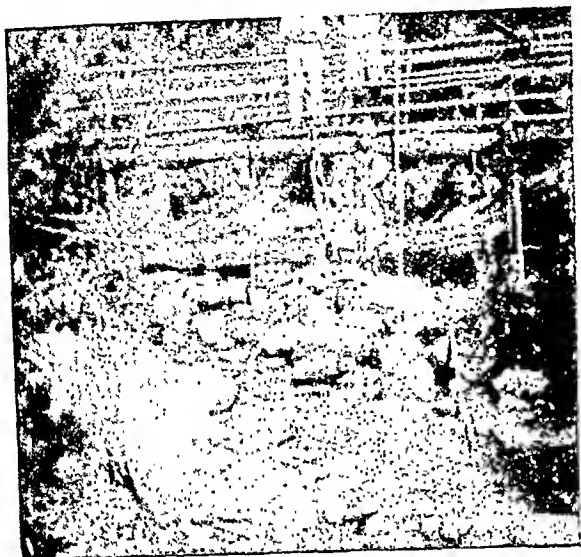


FIG. 4.—*A. Maculatus* will be found where land is more hilly, as in Cachar.

when the malaria season is starting. It is a clean water breeder; seepage or fresh water pools in the beds of streams or drains in the uplands or where subsoil drainage is good are its natural habitat. It would not be found on low-lying lands like the *pathar* level, hence a place like Dibrugarh is not malarious. Drainage eradicates it as it cannot breed in running water.

A. JEYPORIENSIS.

This species, in the light of our present knowledge, need not be seriously considered.

I only found it on one occasion in South Sylhet; Dr. Meek has since sent (from Cachar) a number of specimens caught in August, but as no one during the previous surveys has reported it, it cannot be of any great epidemiological importance.

A. FUNESTUS (MINIMUS) AND A. ACONITUS.

I will deal with these two species together as they are closely related. It is not usual to find them on the *pathar* level; their habitat lies in streamlets of running water edged with grass, (figs. 5-7). The larvæ have the thorax particularly well developed, which enables one to distinguish them from most other anophelines with the naked eye. Watson says they are found in the clearest water, e.g., "in the *bhils*."

McCombie Young in the Lumding survey and Challam and McCombie Young at Nalbari decided that in these places *funestus* was the chief carrier, while Watson in Doom Dooma concluded that it was of the greatest danger to the tea gardens; he found it in abundance and of

adult anophelines caught in houses 45 per cent. were of this species.



FIG. 5.—Streams breeding *A. funestus*.



FIG. 6.—Streams breeding *A. funestus*.



FIG. 7.—Streams breeding *A. funestus*.

I found 136 breeding places out of 1,730 during September to November, 1923, *umbrosus* being the next among the malaria carriers with 29. The species was not found in comparatively non-malarious localities.

It is generally agreed then that this is an enemy of the first importance and this is equivalent to saying that the *streams and irrigating channels of the rice-fields are culpable* (figs. 8, 9).

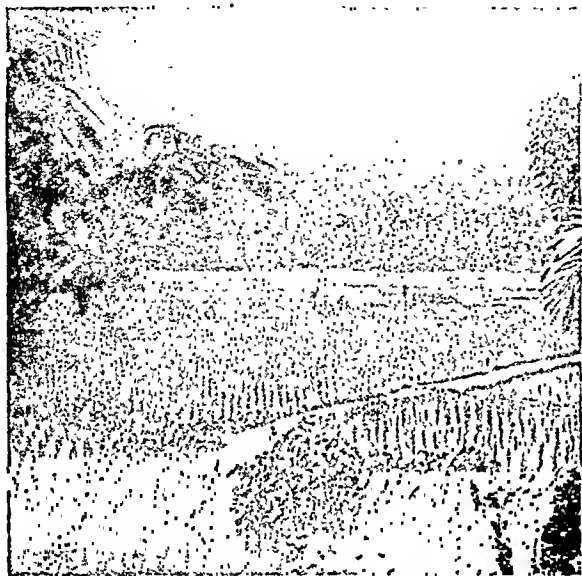


FIG. 8.—The irrigating channel of a rice-field.

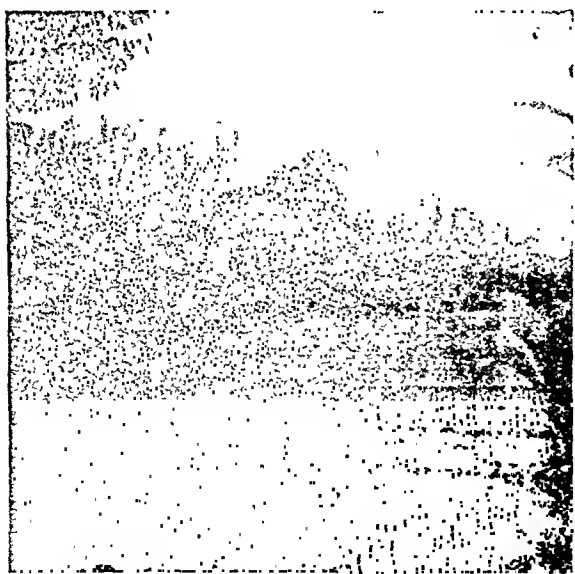


FIG. 9.—Rice-fields irrigated by a side channel, which harboured *A. aconitus*.

CONCLUSIONS REGARDING THE RELATIVE IMPORTANCE OF THE SPECIES.

Of the known malaria carriers which occur in Assam I have concluded then that *funestus* and *aconitus*, represented in the paddy-fields, are very dangerous; that probably during the rains *culicifacies* breeding in pools of pure water is also of danger; that *maculatus* breeding in spring-water cannot on present evidence be incriminated with

doing much harm; that *umbrosus* lurks in all undrained jungle which should be viewed with great suspicion; and that *jeyporiensis* takes no important part in the causation of the disease.

MOSQUITO CONTROL.

MEASURES NOT DEPENDENT UPON A MOSQUITO MALARIA SURVEY.

On the subject of mosquito control one may first consider those methods which are not dependent on a mosquito survey.

Sterilising the blood of the carriers of the parasite.—The carriers from whom the mosquito mainly becomes infected are the children, and every effort, I suggest, should be made to treat such children with quinine so as to prevent them infecting the mosquito. A similar principle is observed in the practice of protecting from mosquitos all persons with parasites in their blood, for instance, in screened hospitals or segregating the sick. Parasite parades might be held regularly, once a week, using Knowles' and Das Gupta's (1924) excellent thick-film method for discovering the parasite.

Quinine* unfortunately has many limitations, of which the outward symbol is the excessive malarial incidence of the estates. It is to be hoped that the chemists will soon discover something as effective for the malaria plasmodium as trypan-blue is for *Piroplasma canis*.

Protection from the bite of the insect.—For the European some protection is afforded by the use of mosquito boots and the European in Assam is to be congratulated on his general attention to such matters; but this does not protect other parts than the ankles. For this reason, I strongly recommend the use of mosquito-proofed houses or at any rate proofed dining-room and lounge. *And it is to my mind more important than anything else that clubs should be thus protected.* Nobody who has not lived in a screened house can appreciate its comfort (fig. 10). One objection that is often made against it, is that it is impossibly stifling in the hot weather. Certainly that is so if the screening is fixed, but if it is made to be opened up from sunrise to sundown, my experience is that it does not make the air appreciably hotter.

This measure is of course only applicable to the staff of the estates though I wonder if it would not repay the Companies to give their labour cheap and strong bed nets, starting with those who would apply for them. We all know how the cooly will get under a net except for his feet, but even then his chance of infection is much lessened (and his feet ought to be horny enough to look after themselves).

GENERAL METHODS OF MOSQUITO CONTROL WHICH ARE NOT DEPENDENT ON THE SPECIES OF MOSQUITO PRESENT.

1. *Water-tidiness.*—When any species' breeding-place is "tidied-up" (fig. 11) it is rendered

*I will deal in another place with the so-called quinine prophylaxis.

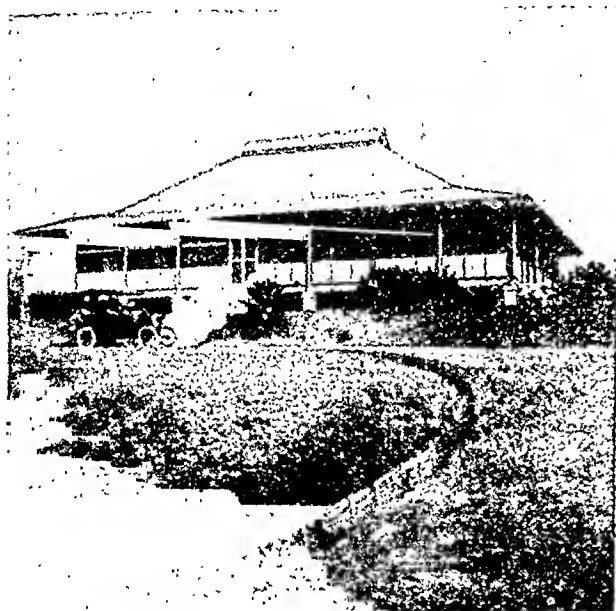


FIG. 10.—A mosquito-proofed bungalow.



FIG. 11.—Water-tidiness, clean-weeding paddy.

less suitable for the life of the mosquito because its protection and food is removed. In pools and ditches of slowly-running water this implies the clearing out of as much debris and foreign matter as possible, also the oiling and burning of all plant life; in streamlets it implies the keeping of the banks and edges clear of vegetation or facing them with concrete (fig. 12) or steps, and "training" or deepening the water-channel to such an extent that plants cannot grow.

Water-tidiness has been the *raison d'être* of the drains put in at Lumding where the old earth drains have been lined with a concrete invert constructed of reinforced concrete and deep enough to carry off the normal drainage and the banks above the drains have been shaped and smoothed down and curved.



FIG. 12.—Water-tidiness, concreting the bed of a hill-stream.

For water-tidiness a mosquito gang under an overseer should be employed.

2. *Subsoil drainage and filling.*—Subsoil drainage will not be discussed here as in Assam it is not "practical politics." Another general measure is filling, but this is expensive. The tank at Lumding was filled. The principle is the same as subsoil drainage, that is, the water is kept underground. In Orissa I have seen shallow natural nullahs, which are prolific breeding-places of certain malaria-carrying anophelines, filled in by the natives to level up the land for rice cultivation; an instance of economics and sanitation going hand in hand.

MOSQUITO CONTROL *vis-à-vis* CERTAIN SPECIES.

There are certain methods of mosquito control which are dependent on the species present.

1. *Open earth-drainage.*—Open drainage implies the confining of all masses of water within regular channels and a fall provided in order to enable the water to run away. There are, however, certain situations where such a scheme is impossible.

Drainage, strange as it may seem, does not appear on the schedule of "measures of general application." Three of the malaria-carriers prevalent in Assam,—*A. maculatus*, *funestus*, and *aconitus*—are stream breeders, the two latter fast-stream breeders, so what one does by confining collections of water into regular channels is to increase the pace or flow of the water and therefore make it easier for *maculatus*, *funestus* and *aconitus* to breed. Watson in 1911 demonstrated this; he drained his swamps, whereupon *maculatus*—which is not a swamp breeder—obtained a habitat to its liking and malaria was increased by the measures taken.* And there is no *a priori*

* Incidentally this example may dispose of the ridiculous hypothesis that a species of mosquito driven out of one type of habitat will establish itself in another.

reason to suppose that what happened in Malaya would not happen in Assam, or an even worse thing because here the species *funestus* is so prolific, while it is altogether absent in Malaya. There is no doubt whatever that it is chiefly in the drains dug by the native cultivators for irrigating purposes that *funestus* and *aconitus* are principally found.

There is, however, the possibility that the reduction of the area of water in a *bhil* may countervail the factor just mentioned and the sum-total of *funestus* output might be reduced: drainage systems are now being used with this idea by Watson to control *maculatus* and *funestus* in the Doom Dooma gardens.

2. *Oiling*.—This measure might be considered of general application except for the fact that in fast-running streams the film tends to flow away and collect in midstream so that its influence soon dies away on the grassy borders where *funestus** and *aconitus* are found.

The utility of oiling is really in inverse proportion to the rapidity of exchange of water in any breeding-place whether that exchange is due to surface water running away or is due to spring-water.

In streams I feel that the cost of this measure is out of proportion to the results and if water-tidiness is resorted to the same results would be much cheaper.

When one comes to consider the pool breeders there can be no doubt of the efficacy of oiling. *A. umbrosus* is essentially a pool breeder, as is *culicifacies*; so is *maculatus* if the pool is of spring-water.

In all such places oiling would be very effective, though in great swamps it is impracticable and they must be drained first. For oiling constant supervision is needed and the cost of the organisation would be high even in Assam in spite of (1) the proximity of the Assam oil-fields and (2) the discovery of the use of castor-oil for aiding the spreading qualities. Oiling has been discarded by the Corporation of Calcutta because of the human equation. Moreover where there is any rice cultivation oiling cannot be used.

Larvacides, which may be considered here, are mostly dangerous and possess no advantages over oil. But Balfour recommends for undrainable swamps a "marine soap" manufactured in Marseilles.

3. *Flooding*.—More might be made of this measure. The practice is to throw a dam across a valley when the effect is to create a large body of deep comparatively still water where swamps or running streams existed before (fig. 13).

Danger may ensue at a later stage when silting takes place to such an extent that water plants may take root, or when there is a mass of certain floating water plants. Moreover, seepage below the dam may be a source of danger.

* *A. funestus* lives at the edge of really fast-running streams while *maculatus* lives in little pockets or bays.



FIG. 13.—"Drowning" a dangerous ravine (Shillong).

At a still later stage the embankment may hold up a solid mass of silt over which the original flow is distributed if it is not retained beneath the surface (fig. 14).



FIG. 14.—At the bottom of the steps is a bed silt held up by a stonework dam.

4. *Jungle-growing*.—This measure is of limited application as there is the danger of *umbrosus* behind it. In Malaya, in parts of the country where *umbrosus* is not found, among the inland hills, where are situated most of the rubber estates, it is the best method of preventing malaria (fig. 15) and it is now, I believe, the law that a permit must be obtained from the Health Department before any jungle is cut. With regard to the "coastal hills," where *umbrosus* is found, I suggested in an unpublished report to the Government of the Federated Malay States (1916) that the *umbrosus* and *maculatus* danger could both be averted by digging drains through the jungle, the only alternative being subsoil drainage which is very expensive.

In Assam I have no reason to suppose that the same procedure would not be perfectly effective, i.e., filling up the "hulas" and "hals" with



FIG. 15.—The best way of preventing malaria, jungle-growing.

jungle after draining them and then neither *umbrosus*, *maculatus* nor *funestus* could breed. Of course rice cultivation would be precluded by this measure.

5. *Jungle-clearing*.—This measure should certainly be resorted to where, after the land is cleared, *culicifacies* and *funestus* will not breed. If this would take place the health would probably become worse. Presumably Dibrugarh and certain tea gardens on the so-called *pathar* level were malarious when they were under jungle, but they have been cleared and drained for settlement or planting and are now comparatively healthy. This is what happened in Malaya where Watson had such great success with his early efforts in 1901.

That completes the summary of the more important operations that can be undertaken in a mosquito-control campaign.

Measures of general application:—

1. Therapy.
2. Protection from the insect.
3. Water-tidiness.
4. Subsoil drainage and filling.

Measures that depend on the findings of a mosquito survey:—

1. Open earth-drainage.
2. Oiling and larvacides.
3. Flooding.
4. Jungle-growing.
5. Jungle-clearing.

SUMMARY.

Reviewing the opinions expressed above, one might say that screening houses and especially clubs is very desirable and that an organised attempt at sterilising the blood of the children should be made.

While with regard to other measures, except in places on the 'pathar level' where clearing jungle should be all that is necessary, one is confronted by something of a jigsaw puzzle which is complicated by the fact that oiling, jungle-growing and flooding are incompatible with rice-growing.

If rice-growing need not be considered then the situation can easily be dealt with by draining and oiling combined, flooding, or by jungle-growing combined with draining.

On the other hand, the only preventive measures compatible with rice cultivation which may be successful are the general measures (except subsoil drainage); none of the special measures given above would be applicable.

The bed-rock alternative is, therefore, which is preferable, the rice cultivation and only perhaps a mitigation of the malarial prevalence, or the rice given up and a non-malarious labour force. I expect many estate managers would say "let us be content with trying to mitigate our condition by means of the general methods." On the other hand, Crawford says "some discipline there must be on every garden in the interests of health."

But the planter must clearly see that if he wishes to control his malaria either on economic or humanitarian grounds he has got to interfere with his rice cultivation.

This rice cultivation seems to be something of a fetish, for in "Castes and Tribes of India" published by the Indian Tea Association, one reads the following passage:—"Facilities for the acquisition of land have in the past been held out as decided attractions to estates which are in the position to grant holdings, either free or at a nominal rent, to the permanent labour force. This factor still, undoubtedly, carries great weight with potential emigrants, but at the same time many instances could be cited, particularly in Upper Assam where *khet* land has never been available, yet labour continues to flock to the estates in all seasons. It might be argued that such concerns are in this fortunate position owing to their strong connections in the recruiting districts, but when we consider the favourable economic conditions that have obtained in the districts during the last three seasons and the fact that sirdars of other estates, having the attraction of *khet* land to offer, have also been endeavouring to recruit, but with comparatively indifferent success, we are forced to the conclusion that the attractiveness of an estate lies, not so much in the offer of material amenities but in a feeling of confidence and faith in the management, in brief, the personality of the Manager."

I have myself seen that many of the gardens in the Doom Dooma District have no *dhan-khet* land and yet the Doom Dooma gardens must procure coolies, for are they not veritable El Dorados? The coolies there seem to be content with patches of *ausdhan* and vegetable gardens, not to mention churches and hospitals with bed

sheets. I ask whether all gardens cannot get on as well as the Doom Dooma gardens, and if not why not?

Doubtless there is no answer, but at the same time let me, for the sake of argument, accept the deep-seated feeling that exists in the matter and see whether anything can be done to cope with the difficulty. The following suggestions might be made:—

(1) That coolies be given their *dhan-khet* at some distance from the lines and the intervening land not rice-cultivated, and the lines concentrated so as to reduce the total non-cultivated area. I am told that the coolie likes to see his rice growing under his very nose, but on the other hand a prominent planter of the Jorhat District, in response to a demand from me that the planter himself should put up suggestions as to how the difficulty should be met, informed me that coolies would be quite content to have their *khet*s some distance away. This view seems borne out by the fact that coolies will sometimes leave their *khet*s and *bustees* for long periods to work on estates, only returning for the harvest.

If the lines then be concentrated on one side and *dhan-khet* parcelled out to the coolies as far away as possible, the intervening area can be treated to the special measures which are necessary, either flooding, jungle-growing, or draining and oiling.

(2) If that suggestion be not liked another to be submitted is based on our knowledge that it is the small *hulas* which are particularly dangerous, therefore, I would ask that the cultivation of small *hulas* only be given up and if that be not admitted, that at least the very dangerous irrigating channels may be dealt with in accordance with the general principles laid down, though I am afraid the results would be but meagre.

We have now seen whatever is strong or weak in the position, if mosquito control is aimed at. In general, I do not agree with Boyd, who has written:—"The simplicity of the theory, i.e., mosquito control, is too often outshone by the complications encountered in its practice. The problem bristles with difficulties which may be so great as to throw the matter out of court on the ground of impracticability."

It is, I hold, a fact that the problem, in no place where there has been a will to succeed, has presented insuperable difficulties, the only real difficulty having been the finding of money.

NON-MOSQUITO-CONTROL MEASURES.

1. *Quinine prophylaxis*.—One must now consider whether that famous prophylactic measure—quinine administration—would be preferable, i.e., quinine given to the whole labour force to prevent their becoming infected by mosquitos. The problem has been analysed by Dr. Hermitte in an address to the Assam branch of the British Medical Association. He came to the conclusion that quinine prophylaxis is efficacious and recommended two doses a night to ensure perfect results as quinine is excreted

8 hours after its ingestion but that only one dose would do a lot of good. On the other hand Dr. Forsyth in his carefully-controlled experiment at Kacharigaon found that with such a system as one would use in ordinary practice it produced no good results.

Hermitte did not mention the very carefully conducted experiments conducted by army officers at Salonika during the war. I think that if British army officers with highly disciplined troops under war conditions came to an adverse conclusion in the matter, their opinion should be regarded as final. Watson's opinion is that for prophylaxis no amount of quinine is of any avail to stamp out the disease. Malaria will not be eradicated unless some medicine vastly more effective than quinine is discovered or mosquitos are destroyed.

In general, therefore, it may be concluded that quinine prophylaxis does not offer sufficient inducement to us to use it rather than mosquito control.

2. *Site selection*.—Site selection is an important rival to mosquito control, but it is expensive. It requires a careful malaria and mosquito survey and a careful calculation as to whether the cost of moving houses, lines, etc., to a new site would be less than mosquito control measures. Certainly, however, when new habitations are being built one should choose the site most carefully and the medical officer should be the first and last man consulted.

SUMMARY.

When comparing the possibilities of mosquito control measures with others, one may summarise therefore that, except for site selection, mosquito control is best. Bassett Smith thinks that the method of destroying the mosquito carrier is evidently a practicable one but that it demands a large amount of co-operation on the part of those whose land is concerned. With intense optimism much can be done. Watson, however, states more forcibly that nothing but mosquito control can give the desired results.

ACCESSORY MEASURES.

There are certain measures which are quite ineffective in themselves as anti-malarial agencies, but which nevertheless are very important in the general campaign.

1. *Education and propaganda*.—Education and propaganda amongst the directors, the shareholders and the coolies is required.

The cooly, I believe, on some gardens is treated to a cinema show and perhaps he could be "got at" in this way by suitable propaganda.

As for the managers and directors, they have only to be shown reasonably and lucidly what has been accomplished elsewhere to be ready to furnish the sinews of war. In fact they seem to want usually very poor arguments to persuade them to pay up. They are, of course, nervous lest experiments should be conducted and prove costly failures, for unfortunately money spent

on the prevention of malaria has not always been repaid. One way of reassuring them would be, I think, for the Assam branch of the British Medical Association to proceed by resolution from time to time on agreed-upon measures which may be confidently recommended to the public. One resolution for instance might be that in the future lay-out of a garden the medical officer should be consulted; the present lay-out of some gardens showing the necessity for such a proposal. I am sure the directorates would feel that such a proceeding protects them from faddists. I could cite an instance myself of how the executive in Malaya was let down by a highly placed medical officer who thinking, *qua* the lady-novelists, that mangrove forest was deadly got money for cutting it down. He acted in quite good faith, but we now know that such a measure converts a healthy place into an unhealthy one.

We therefore have to educate the people who provide the money. Watson has said that most of his life he had spent in fighting the men who were preventing him from fighting the mosquito. I am very glad to see that something more than virtue has now been his reward.

It now therefore only remains for the directors to vote a large sum of money for propaganda among themselves.

2. *Financing anti-malarial measures.*—I am very strongly of the opinion, which I see has also been expressed by Watson, that the cost of anti-malarial work should not effect the commission of the staff of an estate. If it is made to do so, the practice will act like a dead weight on all the efforts of those who are trying to do some good.

3. *Technical education of the Doctor Babu.*—I think it is, an excellent idea that prompts Dr. Hermitte with the sanction of his directors, Messrs. Williamson, Magor & Co., Ltd., to send his doctor babus in a never-ending stream to the School of Tropical Medicine in Calcutta. Every doctor babu ought to have a microscope and know how to use it. If he went to the School of Tropical Medicine he would learn microscopical technique and how to identify mosquitos and parasites.

The school short course is admirably adapted to meet the needs of the tea estates doctor babus; and I am sure that the Director will give the fullest consideration to any suggestions which may be made by the Assam branch of the British Medical Association for making it even more suitable.

4. *Research.*—This must of necessity be largely left to institutions equipped for the purpose. One research suggested above was the looking for chemical compounds which would be better than quinine for clearing the blood of the parasite. The School of Tropical Medicine fulfils such a function and as it is largely dependent on public contributions, it is to be hoped that these will not be stinted.

CONCLUSION.

I have now surveyed the main points in the malaria problem in the Assam tea gardens and I hope I may have carried the reader with me in my argument.

If we are agreed, it is not likely that the planter will lag behind. His chief problem now seems to be the procuring of sufficient labour. As Crawford says, "To get, and still more to keep, labour is becoming yearly a more and more vital factor." Tea has to compete with the industrial concerns and also with plantations in other countries—Ceylon, Malaya, etc. In the competition Crawford says "The comparative attraction of particular estates will exercise an increasing influence on the labour supply"; the healthiness of a place "where the water is good" is undoubtedly such an attraction. I have myself seen how easy it has been for the healthy rubber plantations in the Federated Malay States to obtain coolies as compared with the unhealthy estates. While coolies on the healthy coast land were getting from 24 to 30 cents a day those in the malarious uplands took 60 to 80 cents.

Countries like Malaya and Ceylon have certainly paid more attention to sanitation than has India in general, so they have obtained a lead in the race which should now be reduced by Assam. It does seem lamentable that a quarter of a century after Watson started his work in Malayau plantations that a start has only just been made in Assam. All the more credit to the Associated Doom Dooma Companies and to Messrs. Duncan Bros. for being the first to make a move.

A development of the labour situation has come about during a generation of planting in that it is now seen that a sufficient labour force may perhaps be brought up on an estate. There is a growing labour force of 1,000 children, aged from 2 to 10 years, on Alinugger Estate in Sylhet. But this is a healthy estate and I doubt whether that would be possible in a highly malarious locality. As Watson says, "Quite apart from the sickness among the men, the women are concerned with the sickness and loss of their children, and where the greatest primal instinct—the maternal instinct—is thwarted, there can be no rest or stability among a people. Loss of, and sickness amongst, children unsettle the women; they blame the water, the food, the air, ghosts, spirits and other more or less real or imaginary causes. They instinctively seek to flee from the place, and what the woman thinks to-day, the man thinks to-morrow. They hear rumours and reports of healthier places and better pay, and as Mr. Ramsden told me, coolies leave here to seek employment elsewhere, but few or none come up here from lower down the valley. On the other hand, if her children are well and healthy a woman is generally loath to move, as she fears for her children in a strange place."

I conclude by saying myself that the motto for the combat should be "save the women and children."

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THE TREATMENT OF MALARIA WITH PERACRINA 303.

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THE MAKERS' ADVERTISEMENTS.

THE Haco Company of Berne, the manufacturers of Peracrina 303, have been kind enough to furnish me with a supply of this preparation for the treatment of persons suffering from malaria. They have sent me, in addition, a number of letters and pamphlets describing Peracrina and its employment in the treatment of malaria. Among these pamphlets were the "Therapeutic News" edited by the Haco Company and a report by Dr. J. Walker on the treatment of malaria with Peracrina, which was published originally in the *Archiv für Schiffs- und Tropen-Hygiene*.

The following information was contained in the pamphlets:—When Dr. Walker went out to the famine districts of the Volga, with the Swiss Red-Cross, the Haco Company gave him a supply of Peracrina to be used as an intestinal antiseptic. It did not prove to be of value for this purpose but to the surprise of the physicians attached to the expedition "it was found to be at least equal to quinine in the treatment of malaria."

The makers describe Peracrina 303 as "the chemical compound of an acridine dye stuff with a specific albuminate prepared according to a patented process. It is made up in sugar-coated pills each containing 7.7 grains." The dose recommended is eight pills per diem for children between nine and sixteen years of age, and

twelve pills a day for adults; but it is added that "small doses of Peracrina have worked with great success, very serious cases of adults and older children have been cured by doses of two to four pills." It is recommended that the pills be taken before meals at the rate of two pills at a time. The Haco Company advertise that Peracrina does not speedily reduce high temperature, but, if systematically employed, it cures malaria completely and permanently. A complete course of treatment lasts from three weeks up to three months, for it must be continued for a fortnight after an examination for plasmodia in the thick blood film has given a negative result. It is sometimes observed that during the first three weeks of treatment, the blood test shows an increase of plasmodia and during the same period the temperature has a tendency to rise occasionally. These symptoms need not cause anxiety. The Haco Company, Ltd. are willing to give to every physician the opportunity of judging for himself. Upon receipt of a money-order for two pounds, 400 Peracrina pills in two registered sample-packages will be sent to you. They should be sufficient for the treatment of an average test case of chronic malaria."

Dr. J. Walker claims to have treated seventy-two cases successfully with Peracrina, and, as illustrations, he reproduces the clinical histories of three cases, namely, Dollimanowa, Peredumowa and Assuna.

Case 1.—Dollimanowa. A case of acute benign tertian malaria. Peracrina was administered from the outset, and the treatment was continued for more than three months. The patient had six paroxysms in the first fortnight, the last was on the fourteenth day. She had no more fever during the rest of the time she was kept under observation, but malarial parasites were found at each of twenty-one examinations made during the first eighty-six days of treatment; the last occasion on which they were found being the eighty-sixth day. During the next eighteen days three examinations were made with negative results.

Case 2.—Peredumowa. A case of chronic benign tertian malaria. This patient had occasional attacks of fever up to the sixteenth day of treatment. The blood was examined twenty-nine times during the first two months, with positive results on twenty-one occasions. Schizonts were found on the sixty-second day of treatment. No parasites were found during the next fifteen days.

Case 3.—Assuna. A case of mixed tertian malaria. The patient had occasional attacks of fever up to the forty-ninth day of treatment. The blood was examined twenty-six times during the first eighty days, with twenty positive results. Trophozoites were present on the seventy-eighth day. Three negative examinations were made during the next thirteen days.

A CRITICISM OF THE ADVERTISEMENTS.

(1) *The composition of Peracrina 303.*—The makers state that Peracrina is a chemical compound of acriflavine with a specific albuminate. The pills which I received from them consist of a soft, brown, granular substance enclosed in a brown, sugary coating. When some of the granular substance was put into water, it did not

dissolve but the water became a fluorescent, yellowish green. The urine of patients, who are taking Peracrina is similarly coloured. When the pill mass was examined under the microscope it was found to consist of yeast cells, stained yellow. There were a few round starch grains mixed with the yeast cells. Several pills were examined and they were all found to consist of yeast. The cells were dead, they would not grow on laboratory media. The makers' description of Peracrina as a chemical compound with a specific albuminate appears to require modification.

(2) *The cost of Peracrina.*—The makers say that four hundred pills are necessary for the treatment of an ordinary case of malaria a treatment which occupies three months. The retail price in Singapore of a bottle containing a hundred pills is \$6, or fourteen shillings. Four hundred pills would, therefore, cost \$24, or two pounds sixteen shillings. This is much more expensive than quinine. The retail price of quinine sulphate is \$1.25, or two shillings and eleven pence, an ounce; and an ounce is sufficient for the treatment of an ordinary case of malaria. If quinine were given at the rate of 20 grains a day, for three months, about four ounces would be used and the cost would be \$5, or eleven shillings and eight pence. It is evident from these figures that the high price of Peracrina puts it beyond the reach of all but the rich. It is too expensive for use in hospitals or for the treatment of labourers on rubber estates or tin mines.

(3) *Dr. Walker's results in the treatment of malaria.*—The duration of the fever, in the three examples selected by Dr. Walker to illustrate successful treatment by Peracrina, was fourteen days in the first case, sixteen in the second and forty-nine in the third. Malaria parasites were found up to the eighty-sixth day in the first case, the sixty-second in the second case and the seventy-eighth in the third. As the treatment was continued for at least a fortnight after all parasites had disappeared, which is in accordance with the advice of the makers of Peracrina, it follows that the average duration of treatment in these three cases was eighty-nine days. People will not continue to swallow eight or twelve large pills every day for such a long period—(those supplied to us weighed ten grains a piece)—unless they are kept under the closest supervision; few patients can be observed and treated for so long. Malaria patients in this country, usually leave hospitals in less than ten days.

Very few people, at the present time, have followed the course of untreated malaria over a long period. In his book, "Malaria at Home and Abroad," Colonel S. P. James gives the charts of three Indians, suffering from untreated malaria, whose temperatures were recorded for several months. No one who compares the charts of these untreated Indians with those illustrating Dr. Walker's Peracrina cases, can fail

to see their resemblance. As James says, "in the great majority of cases of uncomplicated malaria the general course is towards recovery." The administration of Peracrina may have had nothing to do with the eventual disappearance of the parasites in Dr. Walker's three cases.

Dr. Walker's reports show that the treatment takes too long to be generally useful, and they fail to prove that Peracrina exerts any influence on the malaria parasite.

CLINICAL TESTS OF PERACRINA IN KUALA LUMPUR.

Through the kindness of Dr. E. A. O. Travers, the Medical Officer in charge of the District Hospital in Kuala Lumpur, I was able to give Peracrina to eighteen men who were suffering from malaria. I was not able to detain these people in hospital for more than ten days or a fortnight, nor could I keep them under observation after their discharge; it was, therefore, impossible to give them the three months' treatment recommended by the Haco Company.

The object of this inquiry was to determine if Peracrina could be used in the hospitals of the Malay States, instead of quinine, with equally good results in the cure of an attack of malaria. The question of permanent cure cannot be investigated accurately in a country where it is seldom possible to follow up a case after treatment or to insure against re-infection.

The eighteen patients were all labourers from rubber estates or tin mines. Fifteen of these were Tamils and three were Chinese. Six were suffering from subtertian malaria, six from benign tertian, five from mixed tertian and one from quartan. Eight pills a day were as many as we could persuade the patients to take. The average weight of the men was 101 lbs., consequently this dose was equivalent to twelve pills given to a man weighing 150 lbs., and twelve pills a day is the dose recommended by the makers. The pills were given to the patients in the laboratory. Blood films were examined twice a day and, at the same time, the urine was inspected for fluorescence and tested for quinine and albumen. This was done by my assistant Mr. Kandiah and myself.

The patients were divided into two groups. The first group comprised nine patients who were treated with Peracrina alone when they were first admitted to hospital. Quinine was not given to them until its administration became imperative. These cases were Nos. 6, 7, 8, 9, 11, 15, 16, 17, 18. In all of them, except No. 8, the number of parasites either increased or remained stationary and it became necessary to give quinine.

The second group of nine cases, Nos. 1, 2, 3, 4, 5, 10, 12, 13, 14, were given quinine at the commencement of treatment, either alone or in combination with Peracrina. As soon as the parasites had disappeared, quinine was discontinued and Peracrina was given alone. In two

cases, Nos. 4 and 5, there was no relapse while Peracrina was being given, but they were under observation for only five and eight days, respectively. In the remaining seven cases, Nos. 1, 2, 3, 10, 12, 13, 14, the parasites multiplied when the quinine was stopped and Peracrina was powerless to prevent relapses.

Most of the patients had suffered from former attacks of malaria. They had taken quinine then and they knew that it could relieve them. Eight patients who relapsed under Peracrina refused to continue taking it and asked that they might be given quinine instead.

There was no evidence, from the experiments, that the drug had any effect upon malaria parasites.

DETAILS OF THE TREATMENT OF EIGHTEEN PATIENTS WITH PERACRINA.

Case 1.—Tamil. Weight 70 lbs. Disease, subtertian malaria. This patient was given a week's treatment with cinchonine, in doses of seven grains twice a day. The temperature became normal on the third day and all parasites had disappeared by the end of the week. On the eighth day cinchonine was discontinued and Peracrina was given instead. There was no fever until the seventh day when a relapse occurred and trophozoites reappeared. They increased rapidly until there were more than one parasite in every two fields, by the nineteenth day. The Peracrina was then stopped and fourteen grains of cinchonine were given twice a day in its stead, with the result that there was no fever after the second day and no trophozoites after the third.

Case 2.—Tamil. Weight 100 lbs. Disease, subtertian malaria. Five grains of cinchonine were given twice a day together with Peracrina. The temperature became normal after two days' treatment and no trophozoites were found after the third day. Cinchonine was stopped on the fourth day and treatment was continued with Peracrina alone. Parasites reappeared on the sixth day, when there was an average of two in every hundred fields examined. By the tenth day there were twenty times as many and treatment with cinchonine was resumed, in doses of twenty grains twice a day, with the result that the parasites disappeared within three days.

Case 3.—Tamil. Weight, 96 lbs. Disease, mixed tertian malaria. Cinchonine was given in doses of ten grains twice a day. There was a heavy infection in this case but both the fever and the parasites had disappeared by the fifth day. Cinchonine was then discontinued and Peracrina was given instead. Subsequently a few trophozoites were found almost every day and they were present on the twelfth day, when the patient refused to continue the treatment.

Case 4.—Tamil. Weight, 98 lbs. Disease, subtertian malaria. Cinchonine was given in doses of ten grains twice a day. There was no fever after the second day and no trophozoites were found later than the third day. On the sixth day cinchonine was stopped and Peracrina begun. No relapse had occurred when the patient left the hospital five days later.

Case 5.—Chinese. Weight, 110 lbs. Disease, benign tertian malaria. Two five-grain doses of cinchonine were given together with Peracrina. This was a very light infection; after two days' treatment the cinchonine was stopped because neither fever nor parasites were present. Peracrina was continued until the tenth day when the patient left the hospital. There was no relapse during that period.

Case 6.—Tamil. Weight, 90 lbs. Disease, mixed tertian malaria. Peracrina was given alone for seven days, but during this time the subtertian parasites increased

instead of diminishing in number. On the eighth day two nine-grain doses of cinchonine were given because the temperature was 103° F. and there were about thirty rings in every hundred fields. Peracrina was continued until the fifteenth day but the trophozoites increased, the temperature rose, the patient became worse and he refused to take the drug any longer.

Case 7.—Tamil. Weight, 105 lbs. Disease, benign tertian malaria. Peracrina was given alone. When the patient was admitted to hospital there were about twelve rings in a hundred fields. From the fourth to the seventh day no trophozoites were found; but on the eighth day there was a relapse with fever and parasites, and the patient refused to continue taking Peracrina.

Case 8.—Chinese. Weight, 130 lbs. Disease, benign tertian malaria. This patient had a mild attack. He was given Peracrina alone. The parasites disappeared by the sixth day and on the seventh he left the hospital.

Case 9.—Tamil. Weight, 112 lbs. Disease, mixed tertian malaria. Peracrina was given alone. Parasites were still present on the fifth day, when he refused to remain in hospital.

Case 10.—Tamil. Weight, 107 lbs. Disease, subtertian malaria. Parasites were present in large numbers; consequently cinchonine was given in ten-grain doses together with Peracrina for a couple of days. By the third day the number of parasites had diminished, the cinchonine was discontinued and Peracrina was given alone. The parasites increased rapidly and it became necessary to give cinchonine again on the fifth and sixth days. This checked the multiplication of the parasites once more, but as soon as the cinchonine was withdrawn they increased again. On the ninth day Peracrina was discontinued and a course of cinchonine was administered with the result that the parasites disappeared in a few days.

Case 11.—Tamil. Weight, 95 lbs. Disease, benign tertian malaria. Peracrina was given alone for eight days. During this time the patient remained in the same condition. Parasites were found in his blood at every examination and at the end of the period he refused to continue the treatment.

Case 12.—Tamil. Weight, 120 lbs. Disease, subtertian malaria. As this was a rather heavy infection with subtertian parasites—200 rings in 100 fields—quinine was given along with the Peracrina for the first two days. On the third day there were only three parasites in a hundred fields; consequently the quinine was stopped and Peracrina continued alone. On the eighth day the parasites had increased to 580 in 100 fields and the patient asked for quinine. He was given three twelve-grain doses which reduced the number of trophozoites once more and Peracrina was administered alone until the fifteenth day. By this time the parasites had increased again, so the Peracrina was discontinued and the usual treatment with quinine was given in its place.

Case 13.—Tamil. Weight, 100 lbs. Disease, mixed tertian malaria. Twelve grains of quinine hydrochloride were given twice a day, together with Peracrina, for a period of two days. The quinine was then discontinued and Peracrina was given alone. The malaria parasites, which had disappeared on the third day as the result of the quinine treatment, returned on the tenth day in spite of the Peracrina and the patient refused to remain in hospital.

Case 14.—Tamil. Weight, 90 lbs. Disease, subtertian malaria. This patient was given two twelve-grain doses of quinine, on the first day, together with Peracrina. The quinine was then stopped and Peracrina was given alone. There were a few parasites present on the fifth day, when the patient insisted on leaving the hospital.

Case 15.—Chinese. Weight, 105 lbs. Disease, quartan malaria. No quinine was given to this patient for the first ten days of treatment, during which time Peracrina was administered alone. At the end of this period trophozoites and schizonts were still present and the patient was put on a course of quinine.

Case 16.—Tamil. Weight, 93 lbs. Disease, benign tertian malaria. This patient had a very light infection; at the beginning of the treatment with Peracrina one parasite was found in every five hundred fields. At the end of a week when the patient left hospital (with a supply of quinine tablets) the number of trophozoites was apparently the same.

Case 17.—Tamil. Weight, 105 lbs. Disease, benign tertian malaria. Peracrina was given for four days. Parasites were still present and the patient refused to continue the treatment.

Case 18.—Tamil. Weight, 100 lbs. Disease, mixed tertian malaria. Peracrina was given alone for five days. At the commencement of treatment there were twenty-five trophozoites in every hundred fields and at the end of five days their numbers were approximately the same. Peracrina was then discontinued and quinine was given instead, with the result that no parasites could be found after three days' treatment.

SUMMARY.

A supply of Peracrina 303 was received from the Haco Company who are the manufacturers. It is put up in pills weighing about 10 grains each. They consist of a mass of yeast cells and a little starch, stained with a yellow dye. The makers state that four hundred pills are required for the treatment of an ordinary case of malaria. The retail price of this quantity, in Singapore, is \$24, or two pounds sixteen shillings. Treatment with Peracrina is, therefore, much more costly than treatment with quinine. The optimum dose, according to the makers, is twelve pills a day, and they recommend that this dose should be continued for about three months. Few people will submit to this treatment.

The Haco Company state that the malaria parasites may increase during the first three weeks of treatment, and the temperature may rise occasionally. This makes Peracrina unsuitable for use in a country where malignant tertian infections are common and where death may ensue with shocking rapidity unless the number of parasites is rapidly reduced.

A report by Dr. J. Walker on the treatment of malaria with Peracrina, was sent to me by the makers; it was published originally in the *Archiv für Schiffs- und Tropen-Hygiene*. The examples of cures effected by Peracrina, were unconvincing, they did not prove that this substance had any effect on malaria parasites.

Eighteen patients who were suffering from malaria, in the District Hospital at Kuala Lumpur, were treated with Peracrina. Their average weight was 101 lbs., and they were given eight pills daily. Blood films were examined twice a day.

Nine of these patients were given Peracrina alone when they were first admitted to hospital; quinine was not given to them until its administration became imperative. The result was that, in all except one, the number of parasites either increased or remained stationary and it became necessary to give quinine.

The other nine cases were given quinine at the commencement of treatment, either alone or in

combination with Peracrina. As soon as the parasites had disappeared, quinine was discontinued and Peracrina was given alone. In two cases there was no relapse while Peracrina was being given, but they were under observation for only five and eight days, respectively. In the remaining seven cases the parasites multiplied when the quinine was stopped and Peracrina was powerless to prevent relapse.

CONCLUSIONS.

(1) Peracrina 303 consists of yeast cells, a little starch and a yellow dye.

(2) It is impracticable to administer Peracrina for a long period and in the large doses recommended by the makers.

(3) Peracrina is too expensive for general use.

(4) The clinical tests made in Kuala Lumpur did not show that Peracrina had any effect upon malaria parasites.

(5) Malaria parasites may increase during treatment with Peracrina and it is dangerous to employ it in place of quinine.

A Mirror of Hospital Practice.

STONE IN THE BLADDER FORMED AROUND A FOREIGN BODY.

By J. L. LUNHAM, M.B., F.R.C.S.I.,

LIEUTENANT-COLONEL, I.M.S.

Civil Surgeon, Dharwar.

A FEMALE patient was admitted into hospital on 9th May, 1925. She was an adult of about 35 years of age and of fairly good constitution. She had incontinence of urine and complained of pain behind the pubis and lower part of the hypogastric region. She could not walk on account of the pain. Her temperature on admission was 99.6°F.

On examination it was found that there was a stone of fairly big size in the bladder; it was adherent to its wall behind. There was a hard swelling in the front wall of the vagina; it was tender to the touch. There was tenderness and a little hardness just above the pubis.

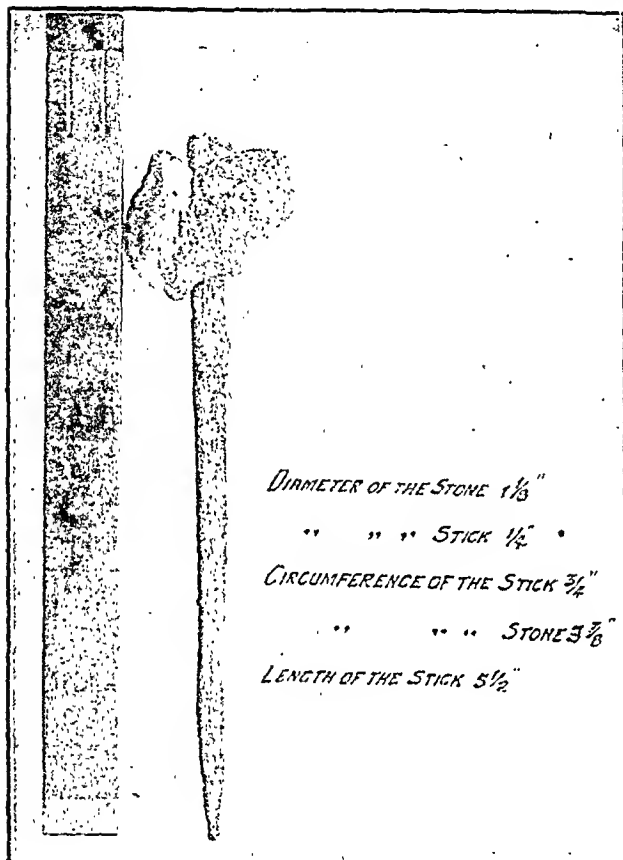
On 11th May, 1925, she was put on the table and anaesthetised. Attempts were made to extract and crush the stone but without effect: the cavity of the bladder was found obliterated. An incision about 1½ in. long was made over the swelling in the vagina. The stone was seized with forceps and extracted; a stick came out along with it. The stone had formed at its thick end. The length of the stick was 5½ in.; the circumference of the stone at the head of the stick was 3½ in. The stick was lying with its

head in the bladder and its remaining portion in the walls of the vagina and uterus. The stone was phosphatic in nature. The wound was stitched with catgut sutures which were removed after ten days; the wound was then completely healed up. Pain and temperature had disappeared. The patient made an uneventful recovery and was discharged cured on 28th May,

inguinal glands were more markedly enlarged on the left than on the right side. The patient looked emaciated but had no defect in any other organ.

TREATMENT.

Operation.—As soon as the patient gained a little strength after a course of free and liberal



25. At the time of her going, she had complete control over the bladder and its cavity had formed.

On asking her as to how she came by the stick, she said that she had inserted it there about two years ago to bring about abortion. Abortion was caused but she could not take out the stick, so it had remained there for about two years.

AMPUTATION OF THE PENIS.

By S. C. DAS GUPTA, L.M.S. (Cal.),

Senior Surgeon, Bir Hospital, Katmandu, Nepal.

SURYAMAN, a Hindu Newar, aged 48, was admitted into hospital on July 16th, 1924. About 17 months previously the patient had noticed a small fungiform growth on the prepuce; he had had phimosis since childhood, but gave no history of any venereal disease.

Condition on admission.—The organ had exactly a cauliflower-like appearance from near the tip to the root (*vide* photograph; removed organ shown suspended by a piece of thread); the

diet, I put him up for operation. Under chloroform, the patient lying on his back, I removed the enlarged glands of the inguinal region on both sides in the first place and stitched up the wound, leaving a small gauze drainage at the outer aspect. He was then placed in the lithotomy position and an elliptical incision was made around the root of the penis joining both above and below, which was prolonged downwards precisely along the median raphe up to the lower angle of the pubic arch. Next, the line of incision over the raphe having been deepened and the testis on each side retracted, the body of the penis was laid bare.

Dissection of the Urethra.—As the part was foul-smelling and full of septic discharge, I did not pass the sound per meatus for fear of carrying the infection deep down. I dissected out the corpus spongiosum and lifted it up on the aneurism needle (just as is done in an intravenous injection) and divided it about the middle and picked up the end with a Kocher's forceps. Then I passed a rather tight-fitting sound up to the membranous portion of the urethra to keep the same as a guide. Next, I proceeded with

separating the remainder of the urethra, having a grip on the sound, from the corpus cavernosum quite back to the triangular ligament, care being taken not to puncture the urethra; then I removed the catheter.

Removal of the corpus cavernosum.—The diseased portion of the penis having been wrapped up in a sterilised gauze and held up by means of a tissue-forceps, dissection was carried downwards separating the corpus cavernosum from the surrounding structures, the suspensory ligament being divided and the accelerator urinæ slit open up to the crura. Meanwhile, the dorsal arteries and vein divided in the course of operation were secured. Next the crura were dissected and ultimately detached by scraping out from the rami of the os pubis by means of a periosteal elevator. Leaving about half an inch of urethra the remainder was snipped off; and lastly, the severed end was slit up longitudinally and the edges were stitched with the margins of the skin at the lowermost portion on either side, about $\frac{1}{4}$ inch protruding and everted. A small drainage tube was left inserted at the lower margin of the wound, about an inch above the insertion of the newly formed urethra, and a soft rubber catheter was left in the bladder attached to a rubber tube for continual drainage into a 4-lb. wide-mouth bottle into which some carbolic lotion was poured to keep the end of the tubing always dipping in. A double spica (bandage) of the groin was applied covering the inguinal region and scrotum up to the opening of the new meatus.

After-treatment.—The patient was kept in Fowler's position for 10 days to ensure free drainage from the bladder. The gauze drainage and tubes were removed after 48 hours. The catheter was withdrawn on the 8th day when the stitches were taken out. The wound healed up by first intention everywhere except at the upper part, near the root of the penis; this also healed up after 15 days.

Note.—In this case I did not remove the testes, which were not in the least affected. Cancer of the penis is very prevalent here; I have operated on over half a dozen such cases and have removed the testes in only two.

In my former cases I did not drain the bladder continuously by a catheter, and these cases getting septic and the dressings being usually soaked due to contamination with urine, I have discarded this practice and now retain the catheter continuously, held up in position by a sticking plaster, till the stitches are removed.

As regards the urethra, I have come to the conclusion that it is best to transplant it as low down as possible with its end directed downwards. The level of the urethra, at which it should be sutured, must be at the junction of its two curves (concave and convex—from above downwards) which meet at about a point midway between the triangular ligament and the bulb.

Nearly half of my cases had strictures of the urethra; the present case came back after three months with a very narrow opening, not admitting even the point of a fine probe. I had to dilate the urethra and keep him in hospital for two weeks more. I saw him last about two months ago; he has no trouble now.

In one of my cases I had again to dissect out the urethra under chloroform and stitch up the everted edges in the manner described above. I believe if the end of the urethra be kept properly everted and a strict aseptic condition is preserved throughout, stricture is not likely.

In conclusion, I think, it is better for a beginner to use a silver catheter in place of a sound, because the former will not only be of help in the dissection of the urethra but will also afford an unmistakable proof of its passage into the bladder by the jet of urine through its opening.

(N.B.—The photo was taken three months after the primary operation. The catheter is seen passed into the bladder and the stillete through the severed end of the urethra.)

SOME SURGICAL CASES.

By RAI SAHIB MUKAND LAL, L.M.S.,
House Surgeon, Civil (Dufferin) Hospital, Delhi.

Case 1.—Pirbhu, son of Nem Sukh, aged 16 years, Hindu male, received a gunshot wound of the abdomen on 15th July, 1924. The shot entered just above the left iliac crest and lodged somewhere on the anterior surface of the sacrum. The boy showed no signs of peritonitis and the superficial wound being healed, he was removed from the hospital by his parents on the 17th but was re-admitted on 25th July, 1924, at 9 P.M. with symptoms of acute obstruction. He was operated on immediately—a tag of omentum was found adherent to the parietes near the wound of entrance forming a loop through which the gut had passed and thus caused obstruction. The band was divided and the gut, being in good condition, replaced. Two wounds were observed in the gut, each closed by a small slough. The two points were invaginated and closed by purse-string sutures. No search was made for the shot as the patient was in a very critical condition and the abdomen was closed quickly. Recovery was uneventful and the patient was discharged cured on 22nd August, 1924.

Case 2.—Durbari, son of Ramjas, aged 12 years, Hindu male, admitted on 10th August, 1924, with symptoms of pain in the abdomen and fracture of the right clavicle. He said that one day before this a heavy bale of cloth fell upon him and gave rise to the trouble. The abdomen was a little rigid; temperature 100°F. pulse quick; and slight pain and difficulty in

passing urine. He was put to bed—the urine drawn off with a soft catheter and the bowels relieved with enemata. On 12th August, 1924, the rigidity and swelling of the abdomen had increased; pulse was small and thready; temperature 100.4° and very little urine could be drawn off by the catheter. Laparotomy was done, a medial incision being made below the umbilicus. The main abdominal cavity was found to be well shut off by adhesions. There was a collection of pus in the pelvis and on inspection a rupture of the bladder was discovered. Good drainage was provided and the wound left open. Recovery was steady and gradual and the patient was discharged cured on 5th October, 1924, the wound closed and healed up as in a case of suprapubic cystotomy.

Case 3.—Harpiary, wife of Surajpal, aged 35 years, Hindu female, came in with a big tumour in the abdomen of about 3 years' duration. She said it was gradually increasing in size and giving rise to pain and discomfort. The growth felt like a solid tumor, non-adherent and freely movable. On examination per vaginam the uterus was found free and the right adnexa thickened. Menstruation was occurring at usual periods but the flow was less than normal. Laparotomy was done on 17th September, 1924, with medial incision below the umbilicus. A dermoid cyst of the right ovary was found which was removed, the pedicle ligatured and sutured after invaginating the stump. A true floating right kidney was found which was lying high up in the pelvis. The left kidney was cystic. It was thought sound to leave the kidneys alone. The patient was discharged in good health on 3rd October, 1924.

Case 4.—Yadu, son of Gurdial, aged 28 years, Chamar male, admitted on 3rd October, 1924, with symptoms of acute obstruction of six days' duration. Laparotomy was done at once. Two bands of mesentery were found which caused the obstruction; these were cut and ligatured and the gut relieved; wound closed as usual and the patient discharged cured on 14th October, 1924. No complications occurred.

Case 5.—Moola, son of Nathu, 35 years, Brahman male, admitted on 30th August, 1924, with a history of injury due to the passing of a cart wheel over the left side of his chest where it produced an ecchymosis about 4 inches by $\frac{1}{2}$ inch. Duration about 12 hours. He had difficulty in breathing—vomiting—and the urine was slightly blood-tinged. On 1st September, 1924, distention of the abdomen increased but there were no definite signs of obstruction. Laparotomy was done. First a medial incision was made and about a pint of blood evacuated from the peritoneal cavity. As the collection seemed mostly in the left flank, the first incision was closed and another made in the anterior axillary line from where more blood was evacuated. The spleen was searched for rupture and, although enlarged, no tear was discovered. The

condition of the patient being serious the wound was rapidly closed without making any further search for a rupture or a tear. Both wounds healed by first intention. The patient being very weak, recovery was gradual and slow; no further accumulation of blood could be detected. There were three complications noticeable:—

1. A patch of pneumonia on the left side probably due to trauma.

2. Bleeding from the bladder which was profuse and lasted for a week—most probably due to primary injury of the bladder itself.

3. Bedsore; this was unfortunate but understandable considering the low vitality and extreme weakness of the patient after so much loss of blood.

Case 6.—Kundan, son of Hukma, 35 years, Hindu male, admitted on 9th October, 1924, in extremely weak and emaciated condition; constant pain in the abdomen which presented an enlarged spleen and two fairly big masses resembling enlarged glands in the epigastric region. The masses were slightly mobile and appeared attached to the posterior wall—non-adherent to the parietes; slight rise in evening temperature to about 99°F; duration 6 years. Considering the general condition of the patient and the size of the masses a provisional diagnosis of tubercular mesenteric glands was formed and surgical interference was thought inadvisable. The patient, due to constant pain, pressed for an operation; and a few days' rest and nourishment helped him to pick up a bit in health. Laparotomy was done on 17th October, 1924; a pararectal incision being made on the site of the tumour. The growth was found to be in the mesentery and fixed to the posterior wall. A small incision was made into the growth, and typical dermoid cyst contents came out. Removal being impossible, the peritoneal cavity was shut off and a drainage tube inserted after removing as much of the cyst contents as possible. This relieved the patient of his pain and discomfort and the cavity went on emptying itself without any further abdominal complication. Sometime later infection took place and the patient died ultimately of exhaustion.

CASES OF APPENDICULAR ABSCESS.

Fifteen cases of appendicular abscess have been treated since April, 1924. The ages of patients varied from 8 years to 50 years and the duration of illness from 4 to 30 days and in one case even longer than this. Thirteen cases were cured and one died due to intense toxæmia. Fæcal fistula formed in 13 cases after operation which closed up in about a week's time.

Experience shows that appendicitis is a much more common disease than it is thought to be among the Indians but it is a pity that most of the cases go undiagnosed or are delayed to such an extent as to form an abscess. Operation is resorted to only as a last measure.

| Appendicitis duration. | Age. | Result. |
|------------------------|----------|---------|
| 4 months | 40 years | Died. |
| 25 days | 20 " | Cured. |
| 15 " | 35 " | " |
| 15 " | 26 " | " |
| Chronic | 50 " | " |
| 30 days | 40 " | " |
| 30 " | 35 " | " |
| 30 " | 20 " | " |
| 7 " | 8 " | " |
| 6 " | 22 " | " |
| 14 " | 15 " | " |
| 6 " | 20 " | " |
| 5 " | 30 " | " |
| 8 " | 30 " | " |
| 3 months | 40 " | " |

N.B.—A few points about these cases are:—

1. Chloroform was used as general anaesthesia.

2. Picric acid 3 per cent. solution in rectified spirit as an antiseptic for the skin has proved a very reliable agent.

3. Silk has been used for all sorts of sutures except the skin. Its sterilization is easy but requires a little care. Boil the hank for 15 minutes, store up in mercury lotion 1-1000 and boil again for half an hour before operation.

4. There have been no complications and little or no reaction after the operation.

OBSERVATIONS ON A FATAL CASE OF LIVER ABSCESS.

By J. P. ARLAND,

LIEUTENANT, I.M.S. (T.C.),

Royal Air Force Combined Hospital, Busrah.

MOHAMMAD KHAN, a bearer in the service of the 1/2 Bombay Pioneers, was admitted into the Cantonment Hospital, Kirkee suffering from a large and painful prominence in the right hypochondriac region.

Previous History.—The patient was addicted to alcohol for the last ten years. He contracted dysentery twice. He served in Mesopotamia for two years.

Condition on Admission.—The patient was thin, weak and wasted; the skin dry, wrinkled and atrophic; and the conjunctivæ were bile-tinged. There was dyspnoea on slight exertion. He complained of increasing debility and loss of flesh and a dull ache in the liver area at times radiating to the right shoulder. An appreciable protuberance the size of a large apple was seen immediately below the right costal arch; the skin over the tumour was oedematous and shiny.

Diagnosis.—A provisional diagnosis of liver abscess was made and was confirmed by aspiration.

Operation.—The patient was prepared for operation. A preliminary intravenous injection of 2 pints of saline with adrenalin was made. An incision 2 inches long was made over the most salient part of the tumour; after division of the superficial structures the anterior sheath of the rectus was incised, the muscle displaced internally and the peritoneal cavity opened up. A large rounded liver mass presented in the wound. The peritoneum was packed all round with

two tiers of gauze towels and an incision $\frac{1}{4}$ inch long was made in the bulging abscess. There was a sudden gush of pus which rose to a height of about 10 inches. It was noted that the wound in the abscess had increased to 1 inch; this was doubtless due to the friability of the cellular tissue combined with the great internal tension of the abscess cavity. Pressure was instantly made over the opening in order to provide for a slow and uniform flow.

At this stage the patient stopped breathing; his head was instantly lowered and artificial respiration commenced. After a lapse of 10 minutes, when no signs of recovery were perceptible, a rapid incision was made in the fourth left interspace and the heart exposed. Cardiac massage was started and ten minims of adrenalin hydrochloride injected into the cardiac muscle; instantly the heart began to beat. Artificial respiration was all the while kept on but to no avail; the heart continued to beat for 10 minutes and ceased in diastole.

POST-MORTEM.

(1) The liver was found destroyed to the extent of 2/3rds of the whole.

(2) Heart and lungs empty of blood.

(3) Intestines deeply congested.

(4) The liver was in the greater part of its extent represented by a thin capsule enclosing cellular debris.

OBSERVATIONS.

(1) The quantity of pus evacuated was extraordinary, amounting to a little over two pints.

(2) Death was due to cardiac and respiratory failure.

(3) A marked feature of the case was the early onset of intravascular thrombosis throughout the body.

(4) The emptiness of the heart and lungs may be explained by the great suction action exercised by the inferior vena cava when it was relieved of the great pressure of the abscess pressing upon it.

It may be inferred from the conditions observed in this case that—

(5) Stitching the liver to the abdominal wall in order to shut off the peritoneal cavity is not a safe procedure in cases where the abscess is large and the glandular tissue friable.

(6) In the process of aspiration that part of the needle traversing the abdominal wall is for practical purposes a fixed point, while the part in the friable liver and abscess cavity is not so fixed as one would imagine.

(7) Destruction of the major portion of the liver is not incompatible with life.

Holding these facts in mind, consider the effect on the liver occasioned by the respiratory movements.

The liver moves up and down during respiration; this motion causes the mobile portion of the needle to tear through the liver and thus favours peritoneal extravasation.

In conclusion, I have to thank Captain S. G. Chavan, I.M.S. (T.C.) for his valuable assistance during the operation.

A CASE OF ACCIDENTAL ABDOMINAL INJURY.

By K. V. JOGLEKAR, M.B., B.S.,
Ranebennur.

ON 4th April, 1925, at 3 P.M. I was called up to see a woman, aged 55, with an abdominal injury caused by the horn of a bullock; the accident had occurred in the early morning. I reached the place in the evening at 6 P.M. and found the woman in good condition (pulse and temperature normal). I found that the intestines had come out through the crescentic tear and were wrapped in a piece of dirty cloth. I wanted to stitch the wound under general anæsthesia but the woman declined, saying that she wouldn't trouble me at all even if I did it without anæsthesia.

After removing the cloth I found nearly 9 or 10 feet of the gut out through the wound which was $2\frac{1}{2}$ inches in length. Fortunately the gut was not at all injured. I washed the gut with warm saline and having thoroughly cleansed it pushed the gut in and stitched the wound. Afterwards I gave 3 drachms of brandy. After the operation for 24 hours or so the woman was restless but then made a rapid recovery and after 12 days I found the wound completely healed. Two months later I found the woman in sound health.

The special features of the case being the non-injury of the gut and the rapid recovery even after the gut had been kept in a dirty cloth for fully 12 hours.

*A CASE OF HYDATID CYST OF THE RIGHT PAROTID AND SUBMAXILLARY GLANDS.

By N. P. SHRIVASTAVA, I.M. & S., M.B., B.S.,
Officiating Civil Surgeon, Seoni.

A YOUNG man of about 24 years of age was admitted into the Seoni Main Hospital on 21st March, 1925, with a tumour about the size of a cocoanut situated in the right parotid and submaxillary regions. On palpation the tumour felt loculated and each loculus gave a fluctuating feeling. The differential diagnosis apparently rested between the following:—

- (1) Lipoma.
- (2) Cystic degeneration of endothelioma of the parotid.
- (3) Retention cyst of the parotid or submaxillary gland.
- (4) Cystic hygroma of the neck.

Lipoma was eliminated by:—(a) The site of the tumour being an extremely rare seat of lipoma.

* Read at the Annual Conference of the C. P. Branch of the Indian Provincial Medical Science Association, Nagpur.

(b) The characteristic lobulation of the tumour mass in a lipoma being absent.

Cystic hygroma was eliminated by:—(a) The tumour involving the parotid region essentially, as evidenced by the lobe of the right ear being enveloped and the anterior surface of the masseter being occupied by the tumour. Cystic hygroma is mostly confined to the neck, being caused by dilation of lymph spaces of the branchial clefts.

(b) Cystic hygroma is usually congenital; the tumour in question started during the childhood of the patient and steadily progressed in size till it assumed the present dimensions in the course of about 20 years.

It could not be decided whether the cyst was a hydatid, retention or degeneration cyst.

The patient was operated upon on 25th March, 1925. A curved incision over the prominent part of the tumour was made and as soon as the fascial and muscular strata were cut through, the cyst wall at its thinnest part was accidentally punctured and there popped out a globular ball characteristic of a hydatid. The cyst wall had contracted numerous adhesions and threw prolongations under the sternomastoid in close proximity to the carotid sheath, substance of the parotid and submaxillary glands, stylomastoid space and under the angle of the lower jaw. Careful dissection, taking special care of the branches of the facial nerve, radicals of the carotid sheath, hypoglossal nerve and its branches, internal maxillary artery, auriculo-temporal nerve and ducts of the parotid and submaxillary glands, had to be gone through to remove the cyst wall in its entirety. Punctures and extension of the daughter cysts could not be avoided owing to the complex adhesions and thinness of the ectocyst. The wound was well irrigated with normal saline solution to wash out the hooklets of the worm discharged with the cystic fluid. Drainage was provided at the most dependent part of the wound.

The patient made an uneventful recovery. Partial paresis of the affected side of the face was noticed but this was mending itself steadily, when the patient was discharged cured on 5th April, 1925. Neither rash nor toxæmic phenomena showed themselves, though their possibility was anticipated owing to the rupture of the cyst wall and contamination of the wound.

The case is mentioned not because it illuminates any new or special surgical technique but because the site of the tumour is a very rare seat of hydatid, and text-books on surgery are mostly silent on the situation.

The patient was a Gond—a class which rears dogs for hare shooting etc., and the presumption is that water or uncooked vegetables contaminated by dogs' excreta were taken and the ova of the hydatid were sucked in through the Wharton's and Stenson's ducts and proved prolific of the cyst.

Indian Medical Gazette.

NOVEMBER.

TREATMENT OF KALA-AZAR.

TEN years ago, there was no specific treatment for kala-azar. The patient who became infected with the disease had to look forward to a long-continued illness which would probably terminate at his death. There was just a chance that the disease might disappear spontaneously or that some severe secondary infection, such as pneumonia, would raise his general resistance—his leucocyte count in particular—and thereby help him to get the better of the *Leishmania* infection. Numerous forms of treatment were tried, most of these being directed towards the production of a leucocytosis, but there was little evidence that any of them increased the patient's chance of survival to any extent. The introduction of the tartar emetic treatment revolutionized the whole outlook of the kala-azar patient. Sir Leonard Rogers was the pioneer of this treatment as far as India was concerned; a number of cases of Indians and Europeans were treated under his directions in the Medical College and in the Presidency General Hospitals in Calcutta. About the same time Muir started to treat large numbers of cases as out-patients at Kulna and laid the foundations of the system of wholesale treatment of the disease. The provision of hospital accommodation for even a tenth of the cases of kala-azar in Bengal and Assam, would have been a totally impossible task, but the treatment as out-patients of the hundreds of thousands of patients that modern diagnostic methods have shown to be suffering from the disease is by no means an unattainable ideal. Distinct progress towards the solution of the problem of the treatment of the disease was made during the next few years; the advance consisted of the introduction of sodium antimony tartrate, as an alternative to the potassium salt, in the production of pure preparations of the tartrates, but most of all in the education of the medical profession in the methods of treatment with these compounds. The problem was tackled vigorously in Assam where Lieutenant-Colonel T. C. McCombie Young, I.M.S., the Director of Public Health, organised large numbers of treatment centres all over the province and later in Bengal where the authorities had been slower to realise the gravity of the situation which was to a certain extent overshadowed by the malaria problem. The dispensary returns in the two provinces showing the number of cases of kala-azar treated each year since 1920 are as follows:—

| | Assam. | Bengal. |
|------|--------|---------|
| 1920 | 7,188 | 7,382 |
| 1921 | 15,880 | 7,689 |
| 1922 | 19,659 | 13,317 |
| 1923 | 35,071 | 57,238 |
| 1924 | 48,770 | 139,085 |

Up to the year 1922 little improvement had been effected in the treatment of the individual case. An organic compound of antimony, "Stibenyl," had been introduced and used with success in England and on the continent, but in India the preparation proved a failure. The first pentavalent organic compound that was used with any degree of success was urea stibamine; at first the results were irregular but it was soon apparent that on the whole the results obtained with this compound were infinitely better than those obtained with the simpler antimony salts.

About the same time "von Heyden 471," another pentavalent compound very similar to "Stibenyl," was introduced. Good results were obtained with this compound which had the advantage of being absolutely stable in the Indian climate. A few other pentavalent compounds have been used and found to have a curative value similar to the above mentioned compounds, but these have not yet come into general use. The advantages of the pentavalent compounds over the tartrates may be classified as follows:—

(i) The compounds are much less toxic and can, therefore, be administered in larger doses.
(ii) The total amount of antimony which is necessary to effect a cure can thus be administered in a much smaller number of doses. About 12 doses of the pentavalent compounds—against the 30 doses of sodium antimony tartrate—can be looked upon as the average number necessary for a non-resistant case.

(iii) Resistant cases, which show little improvement with the tartrates, rapidly improve when given the relatively larger doses of antimony in the form of the non-toxic pentavalent compounds.

(iv) Certain disagreeable symptoms, such as coughing and severe joint pains, which are frequently associated with the sodium antimony tartrate treatment, do not occur when the pentavalent compounds are injected.

Against the pentavalent compounds there is only one point, that is *cost*. Whereas the best preparation of sodium antimony tartrate costs about 1 anna a gramme, urea stibamine costs Rs. 12-8 to Rs. 25 per gramme, according to the size of the ampoule purchased, and "Stibosan" (the proprietary name for "von Heyden 471") Rs. 10 per gramme. That is to say, the cost of the pentavalent compounds is at least 160 times as great as that of the antimony tartrates. This means that to effect a single cure (to ensure which takes on an average 3 grammes and not one gramme which amount will only effect a small percentage of cures) the cost will be 3 annas, Rs. 40 (about) or Rs. 30 according to

whether sodium antimony tartrate, urea stibamine, or Stibosan are used.

Let us consider the facts for and against the pentavalent compound in the reverse order of their importance. The symptoms associated with the injection of the antimony tartrates enumerated above are the exception rather than the rule and seldom cause more than slight inconvenience to the patient. (No mention has been made of pneumonia as a complication of antimony tartrate injections because it is a complication which often occurs in the untreated case. It is, however, a complication which turns up with such regularity—in about 5 per cent. of hospital cases treated with sodium antimony tartrate—that it is impossible not to associate it with the known fact that some of the antimony in sodium antimony tartrate, which forms an acid solution, is precipitated when the latter comes in contact with the alkaline blood and that this precipitate will probably be caught in the lung capillaries. Fairly extensive experience with Stibosan has shown that with this compound, at any rate, pneumonia is a very much less common complication).

It is obvious that the pentavalent compounds are indicated where the patient has any of the unpleasant symptoms associated with injections of antimony tartrate and in cases which have any lung complications. Next, it is perfectly obvious that all cases which are resistant to treatment with the tartrates should be given one of the pentavalent compounds. Finally, there is the question of the reduction in the length of the course of treatment on the one side and the high cost of the drug on the other. These points will have to be considered in relation to the different classes of patient,—the private patient, the hospital patient, and the outdoor dispensary patient.

The problem of the private patient is a simple one; by expending the larger sum, Rs. 40 or Rs. 30, he will require only 12 instead of 30 injections and will thereby save 18 visits from his attending physician. Even if he is only paying Rs. 5 per visit the balance will be greatly in his favour.

The next case is that of the hospital patient; here the choice of treatment lies with the hospital authorities and it is their point of view that must be considered. Urea stibamine is being supplied to certain hospitals and public bodies at a very much cheaper rate than that charged to the general public, Rs. 3-6 per gramme is the figure which is quoted by the Director of Public Health, Assam. Stibosan is also supplied in bulk for hospital use at a very much reduced rate. The average cost of treating one case, therefore, works out at Rs. 10-2 or about Rs. 10 more than the cost of sodium antimony tartrate. The length of time which each patient has to stay in hospital is reduced from 10 to 4 weeks (allowing 3 injections each week) so that there will be a saving of 6 weeks of hospital diet and accommodation; this easily compensates for the extra cost of the

drug and the actual cost of treating each patient is thus reduced. The source of revenue of the hospitals does not, however, vary directly with the number of patients treated so that there is another point of view to be considered. In most places in Bengal the supply of kala-azar patients is inexhaustible so that empty beds are rapidly filled and the hospital authorities are faced with the fact that every bed available for the treatment of kala-azar patients is filled and emptied 12 times during the year, if the pentavalent compounds are used, instead of 5 times as in previous years, and that the cost of maintaining specific treatment will be Rs. 121-8 instead of As. 15 per annum for each bed available. Looking at the matter from both points of view, it is obvious that the balance is in favour of the pentavalent compounds and that in time these will have to be used almost exclusively in hospitals; if the extra expenditure cannot be covered then the number of beds available for kala-azar cases will have to be reduced, the other beds being made available for patients suffering from less expensive diseases.

Finally, there is the case of the dispensary patient. During the last few years societies have been formed in Calcutta and elsewhere whose main object has been to give free treatment for kala-azar to villagers who can neither afford to pay a private doctor nor even their railway fare to, and their maintenance in, Calcutta whilst they undergo treatment. The injections have usually been given by voluntary workers, so the working costs of these societies in proportion to the useful work they have done has been very low. The cost of the sodium antimony tartrate required to treat, say, 1,000 cases would be less than Rs. 200, a negligible sum, but if a pentavalent compound were used, at the cheapest rate, it would mean an expenditure of Rs. 10,000, a very considerable sum to such a society. Or take the case of the Assam Government during 1924. 48,770 cases were treated at the dispensaries in the province; these were for the most part treated with sodium antimony tartrate. The extra expenditure entailed in substituting, say, urea stibamine, would have been nearly Rs. 5 lakhs.

Let us consider what will have been gained by this extra expenditure. The final result to the average patient—we will for a moment not consider resistant cases—will be the same, the recovery rate being about 90 per cent. in either case. The patients will have been saved 18 visits to the treatment centre. In the case of the women and children, this will not entail much, if any, financial gain; in the case of a man it will probably mean the saving of 18 days' work. In addition, if the man is so ill that he cannot work, his return to comparatively good health will be more rapid—at a general estimate he will have saved another 12 days or a total of about one month.

A reduction in the number of injections given would have reduced the cost of maintenance in

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the matter of syringes, etc. A slight saving in staff would also be effected but this would not be in proportion to the number of injections given as in many smaller places the full staff would have to be maintained.

Of the patients attending a dispensary only a certain percentage take a full course of injections, the majority decide when they have had, say, 20 injections and are free from fever that they are cured and do not return for the remaining 10 injections. Some of these patients remain cured but a proportion relapse and then have to have another complete course of injections. This is undesirable from many points of view and one cannot help thinking that this falling off would not occur so frequently if the full course of injections was only 12 instead of 30.

Another point that will have to be considered is the fact that at the present time the pentavalent compounds of antimony are a very valuable commodity. It is fairly well known that all the quinine which is paid for by the Government for hospitals and dispensaries does not reach the patients for whom it is meant. Urea stibamine is retailed at Rs. 12-8 (or more) per gramme, that is to say, its value is about 7 times that of gold—its expenditure would, therefore, have to be checked very carefully.

On the whole we feel that the time has not yet come for public bodies to expend the very large sums that would be necessary to make treatment with pentavalent compounds of antimony the routine treatment in dispensaries, but at the same time it seems desirable that some arrangement should be made for the treatment of cases in which the pentavalent compounds are especially indicated, for example, in resistant cases.

It is obvious that the only real obstacle to the introduction of the new antimony compounds into general use is the present very high cost. There are two factors which influence this price—firstly, the process of manufacture is an expensive one and, secondly, there has, up to the present, been little competition in the manufacture of these compounds. It is not suggested that manufacturers have been profiteering but it is obvious that if a number of commercial firms can produce pentavalent antimony compounds of proved leishmanicidal value, healthy competition will be started and the various manufacturers will be compelled to study economy in the process of manufacture. There is, of course, the danger that useless and even dangerous antimony compounds will be produced and sold at a cheap rate by unscrupulous persons, either as one of the compounds whose value has been proved or as "an improvement" on one of these compounds.

It seems, therefore, desirable that in order to combat any attempt at "cornering" any of these compounds reputable chemical manufacturing firms should receive every encouragement to manufacture and place on the market any pentavalent compound that has been thoroughly tried and shown to be of definite therapeutic value in

the treatment of kala-azar but that at the same time the public, and more especially the medical profession, should be warned against using any preparations that have not had a very thorough clinical trial by a disinterested observer at some well-recognised institution.

L. E. NAPIER.

Current Topics.

Arthritis in Childhood.

By F. JOHN POYNTON, M.D., F.R.C.P. (Lond.),

Lancet, April 18, 1925.

We give some extracts from the report of this important lecture.

Apart from tuberculosis, a severe arthritis is comparatively infrequent in children. In adult rheumatoid arthritis we often fail to detect any convincing evidence of a local focus.

In childhood, with few exceptions we can clearly trace the factor of infection, tuberculous, rheumatic, syphilitic and gonococcal arthritis, influenzal, pneumococcal, meningococcal, and typhoid arthritis, and the septic staphylococcal and streptococcal forms. There are, nevertheless, as in the adult some mysterious cases, variously termed Still's disease or rheumatoid arthritis and some remarkable examples of osteo-arthritis. But we cannot but feel, when we consider the cases of Still's disease, that they must also be infective in origin when we recall the fever, the enlarged glands and spleen, the sweating, and general toxæmia.

Almost every example is an instance of one manifestation of a general disease and if we can hope to solve such a problem as the pathology of arthritis it must be from a study of all the other manifestations of these causal diseases, any one of which may throw a sidelight on the difficulties of the particular symptom "arthritis."

Tuberculous Arthritis.

Poncet, in 1897, described a "tuberculous rheumatism," meaning by this an arthritis which closely resembled in its feature rheumatoid arthritis. That acute tuberculous polyarthritis may occur in children is certain, and you may easily mistake it for acute rheumatism.

Still's Disease.

The chief characteristics are:—(1) An onset which is almost always before the second dentition. (2) The female sex is more often affected than the male. (3) The cause is unknown, one factor of which is that several of the cases have come from low-lying and damp situations. (4) The articulations, apart from the thickened and vascular synovial membranes and ligaments, show little change. In some long-standing cases the synovial membrane has eroded small pits in the periphery of the cartilages, and there may be some fibrous adhesions, but there are no osteophytes, and there is no eburnation of the bones. (5) The lymphatic glands and spleen, which are enlarged, show little change in structure, though there may be small hæmorrhages.

As a rule the onset of the disease is gradual, with stiffness of some of the joints as an early symptom. The knees, the wrists, and the cervical spine are first affected, and the changes involve the capsules of the joints and not the bones; and there is but little fluid exudation and that viscous and clear. The hands and fingers are soon implicated, and the ankles and feet may also soon be attacked. The child has outbursts of pain such as occur in the rheumatoid arthritis of adults. This disease is polyarticular and remarkably symmetrical in its distribution, with great tendency to early contractures and rigidity. The lymphatic glands

are enlarged in association with the joints that are affected; they are not, as a rule, tender and never suppurate, but they may reach a considerable size. The spleen may extend one or two inches below the costal arch but, as it tends to shrink again in the quiescent stage, this enlargement must be sought for during the more acute phase. Valvular lesions are not found, but in a few cases a film-like pericarditis and pleurisy have been discovered after death. There may be some exophthalmos and occasionally jaundice, and the temperature in severe cases is high and swinging between 100° and 104° F., and then the child may have severe sweatings and be extremely ill.

The arthritic exudations, the blood, and in some cases the lymphatic glands, have been removed during life. The results have either been negative or, if micrococci had been isolated, they have not been demonstrated, or reproduced the disease.

Osteo-Arthritis.

Osteo-arthritis in childhood—a chronic arthritis with hypertrophic changes in the synovial membranes, ulceration of the cartilages and osteophytic formation leading to bony thickenings and out-growth—is a very rare occurrence, and, though of much interest, a subject upon which it is difficult to obtain information.

Pneumococcal Arthritis.

This is a very rare event. As a rule one joint is attacked and the order of frequency is the knee, the shoulder, the hip, the wrist, the ankle, the elbow, and the sterno-clavicular joint. The proportion of suppurative to serious cases is about 10 to 1.

Some interesting details were given on the bacteriology of arthritis, by Dr. Nabarro from the Research Department of the Hospital for Sick Children. They are concerned with the result of the examination of the exudations obtained from the joints of 108 cases of arthritis between 1917 and 1924.

In 54 of these the tubercle bacillus was found, or the case on clinical and cytological grounds was most probably tuberculous. Fifty-four were non-tuberculous.

In 21, streptococci were isolated and grown.

In 11, staphylococci were isolated and grown.

In 11, the exudation was sterile.

In 5, the pneumococcus was isolated and grown.

In 3, the influenza bacillus was isolated and grown.

In 1, staphylococci and streptococci were isolated and grown.

In 1, the *Staphylococcus albus* and *citreus* were found. In 1, a Gram-negative bacillus (unidentified) was found.

More than half of the non-tuberculous cases, were under 2 years of age. Eleven were streptococcal and five staphylococcal, three pneumococcal, three influenzal, two were sterile, and one was possibly gonococcal, but the report was doubtful. It is interesting to find that there was not a single case of meningococcal arthritis.

Gonococcal arthritis is a very rare experience, only one doubtful case is recorded by Dr. Nabarro. Congenital syphilis frequently affects the bones and cartilages and may also cause arthritis.

The best defined cases are those in which both knee-joints are attacked and show large, puffy, almost painless swellings which fail to react to any treatment until the true cause is discovered. The diagnosis from tuberculous arthritis may be difficult, but the other stigmata of the disease and the blood reaction usually give the key to the solution.

Influenzal Arthritis.

In October 1924, Dr. Nabarro and Mr. J. F. H. Stallman published a record of three cases of influenzal arthritis occurring in infancy. To those who are interested in the arthritis of adult life these exact records must be valuable, for they will recall how often in cases of rheumatoid arthritis a serious advance in the disease may follow an attack of severe influenza. Here we have proof that the influenzal infection itself may attack the

joints of children. In these three infants the arthritis affected in each case the knee-joint. The exudations were purulent and the Gram-negative bacilli were present in numbers and were both extra and intra-cellular. Two of the cases recovered and the final results were good. One died of influenzal meningitis, but the arthritis in this case also was running a favourable course. The writers, however, point out that in some of the recorded cases there has been total disorganisation of the joints affected. The treatment of these three cases was surgical.

Arthritis and Mumps.

Dr. P. Maisondieu calculates the frequency of its occurrence at just under 0.5 per cent. It is usually a late manifestation commencing about fourteen days after the disappearance of the parotitis, and it may synchronise with an attack of orchitis. The distribution is as a rule monarticular, thence spreading sometimes from one joint to another. There may be much pain and swelling, or again there may be pain in several joints but no swelling. Suppuration is the exception. The temperature may be slightly raised and the duration of a prolonged attack extend over five or six weeks.

Hæmophilic Arthritis.

Hæmophilic arthritis is very uncommon. One of the most obvious features is the acute onset with intense pain; another is the remarkable recovery that may occur in the joints, which again and again seem as it were to rebound from the sudden injury to their structure. Nevertheless we find that there will eventually arise an increasing disability, at first from stiffness, later from more serious damage of the type of an osteo-arthritis. The knees are the joints most often attacked and eventually severe crippling and ankylosis result.

As a rule the diagnosis is not difficult, for we have so frequently a previous history of bleeding either in the patient or in his forbears, and the intense rapidity of the onset, the pain, and the discoloration of the skin round the joint usually also guide us aright.

Dr. Lovell Gulland has found fresh serum most useful. Horse serum may be used either by the mouth or intravenously in 10 c.cm. doses.

Treatment.

The treatment of arthritis in childhood rarely presents any special features from the medical aspect. Rheumatic arthritis is frequent, but with rest the rapid subsidence is remarkable, and we all know the value of the salicylate compounds for this symptom.

The problem in Still's disease is far different. Every sort of drug and treatment has been tried, but no one can claim any certain remedy. Septic foci should receive treatment, but there has been no convincing evidence that as a result the disease has relented. It is important that the patients should be rescued from damp and cold surroundings.

Some Observations on the Routine Treatment of Syphilis.

By L. W. HARRISON,

Practitioner, June, 1925, p. 400.

COLONEL L. W. HARRISON recommends the adoption of certain principles.

(1) Not to risk a relapse, since the eventual eradication of the disease seems then to become much more difficult.

(2) There is no test by which the moment at which the spirochæte of syphilis dies can be determined. We know that all tests of the serum and spinal fluid may give negative results for as long as two years or more and then become positive.

(3) The effect of treatment is not the same in different cases of syphilis, though these may be in the same stage and present the same outward manifestations of the disease.

(4) It certainly seems probable, that arsenobenzol treatment which rapidly destroys accessible spirochaetes interferes with, or stops, the development of antibodies. While a single full dose of "606" can put an end to outbreaks of syphilis in skin or mucous membranes, it is much more likely to be followed by a neuro-recurrence than if the patient is treated with mercury alone, which permits the repeated outbreak of lesions of the skin and mucous membranes. The physician who would do his best for his patient must administer as much treatment as will make reasonably certain that the disease will not recur, and, in determining the amount of such treatment, he has no complete guidance in the progress of his patient. Many examples could be cited of cases in which the serum reactions became negative rapidly, but the patient developed skin or mucous membrane lesions within a few weeks of the treatment being suspended.

The original "606" has largely been superseded by preparations which, whilst being more kindly to the patient than was the first compound issued by Ehrlich, are undoubtedly more kindly to the parasite. Considerations of safety have led to the employment of individual doses of arsenobenzol which are smaller than those used originally, and each injection does not now effect as much towards the cure of the patient as it did before the war.

The routine treatment of syphilitic patients attending the V.D. Treatment Centre at St. Thomas's Hospital consists of:—

(1) For primary cases with a negative serum reaction, two courses each of ten arsenobenzol ("914," or stabilarsan) injections, totalling 6.3 grams "914," with ten one-grain injections of mercurial cream, each course lasting thirteen weeks, with an interval of two months between the two courses.

(2) For primary cases with a positive serum reaction, two such courses followed by one of five injections (totalling 3.3 grams, "914," and 5 grains of mercury) after an interval of two to three months.

For secondary cases, two ten-injection courses as above, followed by two five-injection.

For later cases, a number of courses of seven injections of each metal. More recently bismuth has been substituted for mercury, an amount containing 3 to 4 grams of the metal being given in the ten-injection and 1.5 to 2 grams in the five-injection course.

The records of patients treated on these lines confirm amply the view that "914" administered intravenously does not compare in therapeutic power with "606" according to its arsenical content (roughly 2 to 3), and they justify the very considerable increase of arsenobenzol in the above programmes over pre-war and war courses. Of the patients suffering from primary and secondary syphilis who have arrived at the stage of a positive Wassermann reaction and who had received not less than 5 grams "914" (generally 6.3 grams), between 30 and 40 per cent. gave a positive reaction. It is probable that "914," when administered intravenously, is excreted so rapidly that there is too little time for the spirochaete-destroying derivative to be formed. This is supported by the better results obtained from intramuscular or deep subcutaneous injections of "914." The amount of "914" used must be very much more than previous experience with "606" would lead us to believe would be necessary if this compound were used. Some workers give sufficient arsenobenzol and mercury or bismuth, to render the serum reactions negative, and then prescribe mercurial treatment for the balance of two years. The principle of this plan seems to be the belief that in any case two years' mercurial treatment will cure an early case of syphilis, and that the arsenobenzol makes a little more sure of the result. But two years' mercurial treatment cannot be relied upon to cure even an early case of syphilis. In the years before the war the blood of some hundreds of soldiers who had received the regular Army course of mercurial injections lasting two years was found still

positive to the original Wassermann test in over 40 per cent. of cases.

The results at St. Thomas's Hospital show the great difficulty of converting a positive serum reaction in old-standing cases to negative.

The process is tedious to both patient and physician, but it is just such patients with persistently positive reactions who die suddenly of syphilis of the cardiovascular system or develop seriously disabling diseases, such as general paresis and tabes, at ages when most men are of the greatest value to their families and community. Treatment is troublesome, but the disabilities which it prevents are much more so.

Dietary Control of Nephritis.

By MARTHA KOEHNE, M.A.,

Assistant Professor in Home Economics,
University of Washington, Seattle.

Jl. American Med. Assoc., April 11, 1925, p. 1103.

DIETARY limitations should always be carried out more strictly in acute nephritis than in chronic cases and in young people than in old people.

A. Proteins.—In general, the better the quality of the protein mixture in the diet, the smaller the amount needed for growth purposes and for maintaining nitrogen equilibrium. Proteins from animal sources—meat, fish, poultry, eggs, milk and cheese—are superior in quality to those found in cereals, legumes, fruits and vegetables. Not less than half the protein eaten should be of good quality.

Quantity: Two-thirds gram of protein per kilogramme of body weight is usually considered the minimum on which a person can remain in nitrogen equilibrium. This is possible, only if the quality of the protein intake is good.

It may be advisable, in some cases of acute nephritis, to give less than two-thirds gram of protein per kilogramme. Such a procedure should not be kept up more than a week or ten days, as a rule.

A patient should not be kept indefinitely on a protein intake as low as two-thirds gram per kilogramme, unless it is known that he is having difficulty excreting the end-products of protein metabolism, and that urea is accumulating in the blood. The normal urea content of the blood is from 20 to 40 mg. per hundred cubic centimetres. Concentrations over 50 mg. usually indicate retention of urea. In cases of urea retention in which the concentration of the blood urea does not fall on restriction of the protein intake alone, a low protein diet should not be kept up too long without trying other measures in addition.

If, as is usually true in nephritis, the question is chiefly one of how much protein, there is no real advantage of white meat, fish or poultry over red meats.

It is seldom advisable to give a nephritic patient more than 1 gm. of protein per kilogramme of body weight. The average normal intake for adults is from 1 to 1.5 gm. per kilogramme.

B. Carbohydrates, Fats and Calories.—The only restrictions in the use of such foodstuffs is that the total calories should not go above the amount needed for the production and maintenance of a weight somewhat below average for the patient's age, height, sex and body build. There should also be judgment used in the selection of carbohydrate-rich foods, the preference being given to those that are base-forming, such as potatoes and other vegetables, and most fruits, over those that are acid-forming, such as cereals and a few of the fruits and vegetables. Some fruits and vegetables contain organic acids, such as benzoic and oxalic, which the body cells cannot use as fuel, as they can citric and malic acids. The use of foods containing the former acids thereby increases the acidity of the urine. They should be omitted from the diet of a nephritic patient.

C. Fluid Restriction.—In the early stages of acute nephritis, if the patient is cedematous, fluids should be

restricted to 1 quart. If no œdema is present, $1\frac{1}{2}$ quarts may be allowed. In chronic nephritis, the fluid intake may go up to 2 or even $2\frac{1}{2}$ quarts, if œdema is absent. If œdema is present, not more than $1\frac{1}{2}$ quarts should be allowed.

"There is no proof, to date, that the kidney has more difficulty excreting concentrated substances than very dilute ones." Why, then, give unlimited amounts of liquids when the kidneys cannot excrete them?

D. Sodium Chloride Restriction.—Not all cases of œdema are cases of salt retention, but all cases of salt retention are œdematous. The degree of salt retention necessary is proportional to the amount of such œdema.

1. Salt-free diets are reserved for very acute cases in which, for a week or ten days, the amount of food a patient eats may be disregarded. Such diets are not used in chronic cases, or in acute cases not accompanied by œdema. They should not be used longer than two weeks. The reasons are that:

(a) The patient will not be able to eat enough food because of its extreme unpalatability.

(b) Persistent salt starvation may lead to another type of œdema and prove fatal.

2. Salt-low diets are commonly used in chronic nephritis accompanied by œdema, as well as in acute nephritis. If moderate amounts of salt are used in cooking, and if no salt-rich foods are used, and no salt added to food at the table, the average intake of sodium chloride is from 5 to 6 gm. a day (8 ounces of milk contains approximately 0.5 gm. of sodium chloride).

E. Diuretics and Stimulants.—Tea, Coffee, and Alcohol: Young people with acute nephritis ought not to be allowed to use such substances. Very weak coffee or tea may be used occasionally. Old people, however, with either acute or chronic nephritis, need not be compelled to give them up entirely, provided they use them in moderation. The reason is that such people have become so accustomed to using them that prohibiting their use would result in a restlessness and dissatisfaction that would be far more injurious than their use.

In general, diuretics should be avoided when the kidneys are excreting water with difficulty. As has been said, "Why whip up a lame horse?"

F. Condiments and Spices.—These should be omitted from the diet because of a possible irritating effect on the kidney in excretion. Natural flavours of foods should be relied on.

G. Acid-Base Balance of Food.—Sansum and Blatherwick contend that the elimination of excess acids produced by the regular use of the common acid-forming diets is injurious to renal tissue.

They recommend reduction of cereals, meats, fish, poultry and eggs, the liberal use of most fruits and vegetables, and milk in adequate amounts. The required number of calories can then be made up with neutral fats, starches and sugars.

The treatment of Sprue.

By H. HAROLD SCOTT, M.D.,

London School of Hygiene and Tropical Medicine.
Lancet, March 21, 1925.

CASES of sprue occur where persons who have lived abroad enjoying good health begin to show symptoms of the disease months, even years, after they have retired and settled down at home. Some of the symptoms present in true sprue, such as loss of weight and fatty diarrhœa, are found in other diseases, and also a matter of greater moment.

The most recent form of treatment, based on the results of laboratory tests, is that by calcium and extract of parathyroid gland. The regulator of calcium metabolism is believed to be the parathyroid glands, and this is borne out by the fact that if parathyroid extract is given in doses of one-tenth of a grain twice daily, the symptoms of sprue have been shown to clear up with marvellous rapidity. The ulcerative stomatitis may disappear in ten days or so, the diarrhœa is re-

placed by constipation, the colour begins to return to the stools in two to three weeks, the patient puts on weight, often 3 to 4 lb., sometimes as much as 7 lb., in a week by the end of a month, and his sense of well-being is restored.

The technique of estimating the ionic calcium by Vines's method is as follows: Blood is taken in a glass tube, about 1.5 to 2 c.cm., and allowed to clot. The serum, of which about 1 c.cm. is needed, is then separated and heated in a water-bath to 56° C. for an hour. The steps in the test are three: In the first, by adding fixed amounts, 4 vols., of various dilutions of ammonium oxalate to 10 vols. of fresh normal blood (usually that of the person carrying out the test) and placing the mixture in the thermostat at 37° C. for ten minutes, that strength of oxalate is found which just prevents clotting under the terms of the experiment. The next step is to find out by adding 2 vols. of various dilutions of calcium chloride to fresh arrangements of the above mixture (4 vols. of the determined oxalate dilution and 10 vols. of blood), what dilution of calcium chloride just suffices to bring about complete clotting of the blood. The third step consists in carrying out tests similar to the last but replacing the calcium chloride solution by the same volume of dilutions of the patient's serum, prepared as previously described. By a calculation the calcium content of this serum is thus determined, and in normal subjects will be found to be somewhere between 10.4 and 11.4 mg. per 100 c.cm. In severe sprue it is about 6.5 mg., and after the treatment to be detailed shortly is begun, if this test of blood is carried out weekly, a steady progress is noted, till, at the end of four to six weeks, it is found to reach normal. The theory in part is that one of the actions of the parathyroid glands is to counteract intestinal toxins; that it carries on this work until the toxins are too great for it to cope with. Under these conditions, if the toxins can be reduced, as by careful dietetic regulation, the glands can recover and perform their function again, at least for a time. If, by good fortune, one of the chief causative organisms is isolated and a vaccine made, the administration of this may relieve the gland for a time, hence the good results of some vaccines in some cases and of other vaccines in other cases, as mentioned above; hence, also, the failure of vaccines in the hands of many, some other than the toxin-producing organism having been isolated.

The usual line of treatment by this most recent method is to put the patient to bed for the first 14 days, allowing milk only, beginning with $3\frac{1}{2}$ to 4 pints a day, taken warm (not hot) with a teaspoon, at regular intervals, and increasing by $\frac{1}{2}$ pint in the 24 hours, till at the end of the fortnight 7 to $7\frac{1}{2}$ pints are taken daily. Calcium lactate is also given in cachets containing 15 gr. each, thrice daily, and parathyroid extract gr. $1\frac{1}{10}$ twice daily. It is absolutely essential that the extract be free from thyroïd. If there is constipation a small dose of liquid paraffin is probably the best aperient. From the tenth day onwards some plain biscuits may be allowed, such as water biscuits or Mellin's food biscuits. By this time the ionic calcium has probably increased to between 7 and 8 mg. per cent., and gradual increase in food may be allowed and the patient permitted to be up for an increasing time each day. At the end of three weeks the patient, unless a very severe case or one of long standing, can take milk-puddings, eggs, fish, potato, carrot, bananas, and in the fourth week chicken and non-acid fruits. The calcium can be reduced in the third to fourth week and probably stopped altogether at the end of the fourth. The parathyroid extract should be continued in full doses till the fifth week, then reduced to half doses for a week, and in most cases further reduced until it in turn is stopped altogether at the end of six to seven weeks. This, however, can only be gauged with certainty by the blood test, and the drug must be continued until this shows that the ionic calcium has reached the normal.

It will be found that any return of symptoms, whether due to dietetic or other indiscretion, will be

evidenced also by a fall in the ionic calcium, hence the enormous value of the test as a gauge of progress in this disease.

Though it is perhaps, too early to claim permanency of cure, several of those who had been invalidated home, and forbidden to return to the tropics have, nevertheless, gone back and remained perfectly well, and equally good results have been recorded of patients treated in the endemic centres of the disease.

Treatment of Septicæmia.

Lancet, March 28, 1925.

At a combined meeting of the Sections of Surgery, Medicine, and Pathology of the Royal Society of Medicine held on March 24th, with Dr. Robert, Sir Thomas Horder opened a discussion on the treatment of septicæmia. He said that his views on this subject differed little from those he held ten years ago. The nature of the infecting organism naturally bore on the treatment, and the two common cocci involved were the *Streptococcus pyogenes vel hæmolyticus* and the *Staphylococcus aureus*. He classed the methods of treatment into three main groups: (1) General or non-specific measures, (2) bacteriotherapy, (3) chemotherapy.

General or Non-specific Measures.—This group comprises: (a) Rest, both of the individual and of the region of the primary focus, if this was ascertainable. (b) Fresh air, to the extent permitted by the patient. (c) Sunlight. (d) Diet, which should be free, fluid at the height of the infection but containing many calories. (e) Reassurance, including the general attitude towards the patient and his complaint. (f) Hydrotherapy, about which there was considerable difference of opinion. In America this was more extensively used than in this country. (g) Elimination, with attention to bowels, skin, and kidneys. (h) Sleep. (i) Anodynes, among which he recommended opium, suggesting that we were too loth to use this drug nowadays. (j) Treatment at the site of infection, drainage, elevation, which gave much relief, heat, in the form of continuous baths or fomentations, and antiseptics. He was opposed to the use of very strong antiseptics which might interfere with the vitality of the tissues. (k) Intravenous infusion in acute cases. (l) Transfusion of whole blood, of which he had not had much experience. (m) Drugs, which were useful, but must not be relied on alone. He put first arsenic, preferably in the form of sodium cacodylate, one grain in one c.c.m. of a saturated solution of nucleic acid or sodium nucleinate, given twice daily intramuscularly throughout the whole course of the disease. The smell of the breath showed when the patient was saturated with it. After that came opium and then such other drugs as quinine, strychnine, digitalis, and the hypnotics.

Bacteriotherapy.—This took the form of immune sera, bacteriological antigens, or combined methods. Sir Thomas Horder was accustomed to give an initial dose of not less than 50 c.c.m. of univalent antistreptococcal serum intravenously on the first day, repeating it on the second, perhaps on the third day. By that time an autogenous vaccine could usually be prepared, the sensitised type being the most advantageous form, given in doses of 100 million the first time, 250 million on the third day, and 500 million on the fifth or sixth day. In "immunogen" an attempt had been made to get certain products of auto-digestion of the micro-organism as well as the endotoxin, and this substance was worth trying.

Chemotherapy.—This took the form of chlorine or coal-tar derivatives, metals, or colloidal metals. These had proved disappointing. In the staphylococcal form of the disease the infection was more pyæmic, giving more time, but having the disadvantage that no serum could be prepared. The treatment of chronic septicæmic processes such as ulcerative endocarditis was as disappointing to-day as ten years ago; the best line to take was that of using all possible non-specific methods, especially sunlight.

Sleep and Sleeplessness.

By C. P. SYMONDS, M.D., F.R.C.P.

British Med. J., May 9, 1925.

The Treatment of Insomnia Drugs.

NARCOTICS are of great value in the treatment of insomnia for two reasons: First, the toxic effect of insomnia upon the cortical nerve cells may be more severe than that produced by the drug. Insomnia may lead to depression of the higher mental faculties, and eventually to coma and death. In the second place, small doses of narcotics often facilitate the onset of true sleep. Bromide alone, or in combination with chloral; paraldehyde for a quick action; sulphonal for delayed effect; medinal as a useful all-round narcotic; the coal-tar analgesics and opium for pain or discomfort, comprise the therapeutic stock-in-trade.

Habit Formation.

Of the value of conditioned stimuli in facilitating sleep I have already spoken. Most of us have a ritual of some kind which stands us in good stead when sleep is threatened; it includes the whole business of undressing and getting into bed; the habit of reading in bed is often a part of it. For this reason an invalid, whenever it is practicable, should sit up in a chair just before bedtime while his bed is made, so that he may not altogether miss the experience of going to bed.

Unfortunately, when sleeplessness has persisted for any length of time the old rituals lose their value, and may even facilitate insomnia. Then is the time to initiate new rites, beginning by moving the patient, if not into another house, at any rate into a fresh bedroom. The ritual may consist of some such sequence as the following: a warm bath, into bed, a cup of warm milk or an equivalent, then a solemn plugging of the ears with cotton-wool, perhaps five minutes' reading by the bedside lamp, and then lights out. The sleeping draught, if any is prescribed, may be taken before or with the warm drink. As a finishing touch, the repetition by heart of some soporific verse. Keat's Ode to Sleep is insurpassable in this respect. Such a ritual must be persevered in if it is to be efficacious.

Muscular Relaxation.

Sleep, as we have already observed, is incompatible with any great degree of muscular tension, and there are some individuals who are kept awake largely by their inability to relax their muscles. The tendency for the sleepless person being to toss and turn, it is important that he should learn that this in itself is fatal to sleep, and that the wisest plan is to lie perfectly still. Even though this may demand a certain amount of effort and self-control, it will often induce sleep.

The efficacy of this principle in treatment has been shown most clearly in certain cases of encephalitis lethargica in children, where motor restlessness has been the most prominent symptom of the insomnia. After the preliminary rites of warm bath, sleeping draught, and ear plugging, the child is tightly rolled in a long sheet which is fastened with safety-pins, the arms being included so that he is immobilized. The results in some cases have been striking—for instance, a sleep of nine hours with the pack, as compared with a maximum of four and a half hours when the other measures alone were employed.

Beyond this, there is an art in muscular relaxation, as anyone may prove by attempting to allow one of his limbs to be absolutely passive in the hands of another person. It is an art which patients can be taught to acquire limb by limb until they can themselves practise complete bodily relaxation. The soporific effect of this exercise is sometimes of great value; it may be taught by an instructed masseuse, and may be usefully included among the final stages of the bedtime ritual.

Details of Treatment.

The insomnia due to disease of the sleep centre, such as occurs in encephalitis lethargica, is, the most difficult of all to treat. In many cases, as the normal sleep

time comes round, the cortex appears to pass into a condition of great overexcitement, and this occurs night after night for many weeks with the greatest regularity. It is tempting to believe that in these cases reflex inhibition has been converted by the disease into reflex excitation, and that the cortical cells are thus being abnormally bombarded with afferent stimuli. A combination of drugs and ritual, if persisted in for a long time, sometimes appears to be effective, and immobilization, as already described, is valuable in patients with great motor restlessness. But these cases are, on the whole, disappointing.

The toxic and infective group of insomnias should be treated on the same lines. Here the direct effect of the toxins upon the cortex is, as a rule, reinforced by sources of pain and discomfort. Opium therefore is the most useful drug, and, in cases which are likely to be of short duration, may be used freely. In the chronic cases small doses of medinal combined with aspirin are useful. It is in dealing with this group of cases, however, that it is most important to remember the poisonous nature of the narcotic drugs. The ritual therefore should be made use of as far as possible, and the dose of drugs kept low.

The third group of insomnias—that in which sleep is prevented by unwonted stimuli—offers most scope for treatment. Pain and discomfort must be treated by local measures, and, if necessary, with drugs—*aspirin* or *opium*.

The emotions which have most power to disturb sleep are naturally those which are painful. Paramount are fear and anxiety. We may further distinguish between the open and hidden emotion.

A. An emotion which is present to the waking mind—a declared worry with all its associated memories hinders the onset of sleep.

B. An emotion which has in the waking state been prevented from exciting conscious activity (that is, in the psychological sense, a repressed emotion) may cause insomnia in either or both of the following ways:—

(1) Either the subject finds himself thinking furiously upon some indifferent subject in order to prevent the repressed worry from reaching consciousness, and so is unable to go to sleep; or

(2) He may go to sleep, but is awakened by the repressed emotion forcing its way into consciousness, often in the shape of a dream or nightmare.

The distinction between these two forms of worry—the superficial and the deep—seems to have been present in the mind of Keats when he wrote in his *Ode to Sleep*:—

"Then save me, or the passed day will shine
Upon my pillow, breeding many woes;
Save me from curious conscience, that still lords
Its strength, for darkness burrowing like a mole."

It the latter type of case, in which insomnia is due to repressed anxiety, much can be done by means of judicious analysis and psychotherapy. Free ventilation and frank discussion of the underlying emotional conflicts is the essence of successful treatment.

The open worry, as a rule, is short-lived and resolves itself. Being of an occasional nature it may be justifiably treated with drugs. A whisky and soda at bedtime is often sufficient. It is most important, however, that sleeplessness of emotional origin should be taken in hand early, for the habit of insomnia is readily acquired, and we are then apt to encounter as a perpetuating cause of sleeplessness the anxiety about sleep. The patient goes to bed with the fear that he will not sleep, and this fear, gathering around it thoughts of the morrow's duties, successfully inhibits the sleep reflex and excites cortical activity. This fear must be treated from the start with absolute reassurance. As a cause of unpleasant symptoms the importance of insomnia must be minimized in the patient's sight. Finally, in a case in which this particular anxiety appears to be mainly responsible for the trouble, the patient may be given an effective draught—a drachm and a half of paraldehyde or $7\frac{1}{2}$ grains of medinal, with the assurance

that he will have a good night's sleep. If this follows, the same draught or cachet should be placed by his bedside on subsequent nights, with instructions that he should take it, *without hesitation*, if he is unable to sleep. If the case has been judged correctly this line of treatment succeeds. The presence of the drug by the bedside in itself allays the anxiety, and the patient sleeps soundly without taking it. After a few nights of this kind he ceases to bother about the drug, and as far as his insomnia is concerned may be considered cured.

In the treatment of the emotional insomnias bedtime ritual and muscular relaxation are both of value; the former may also be made a vehicle for reassurance; the latter is most useful in those individuals whose anxiety reflects itself in muscular tension. But the narcotic drugs are also essential in the majority of cases. That they should be at the same time more beneficial and more permissible in this than in other types of insomnia is intelligible in the light of our theory. Here we have the sleep reflex prevented by stimuli arising within the nervous system at a high level of cerebral integration. The cells in which these stimuli arise are therefore themselves susceptible to narcotic drugs in much the same degree as those cells which we have supposed to be concerned with consciousness.

Drugs may be given regularly, at first in sufficient doses to ensure sleep, while at the same time the other therapeutic measures of psychotherapy, habit formation, and relaxation are employed with the object of re-establishing the natural rhythm. After the patient has had a succession of four or five good nights the dose is gradually reduced, the other measures, of course, being continued. In employing this method of treatment we are liable to encounter one of two difficulties—the patient is liable, on the one hand, to develop anxiety lest he become a drug habitué, or, on the other hand, when he finds that his dose is diminished, he may be kept awake by the renewed fear that to-night he will not sleep. The patient should be told that the dose will be reduced without his knowledge. This is easily done if the medinal is given in cachets. The size of the cachet and the amount of its contents are kept constant by replacing the medinal subtracted by sodium bicarbonate. The patient may thus be allowed to go on taking the cachets until he can be told he has now been sleeping soundly on nothing but sodium bicarbonate for several days. Or the cachet may be incorporated as a part of the bedtime ritual for some time longer before the disillusionment is completed.

Diabetic Treatment Simplified.

By FRANK C. EVE, of Hull.

British Med. J., June 6, 1925.

In this paper Dr. Eve gives instructions for the home treatment of diabetes.

"The ground can be cleared by distinguishing clinically between cases of simple glycosuria, which are common and usually unimportant, and stubborn diabetes, which is uncommon and serious. This paper deals with genuine diabetics who are living at home.

Insulin.

The main practical points are:

1. Insulin is something which somehow enables a diabetic to burn up sugar like a normal person but does not enable him to store it as glycogen.

2. Insulin can in this way cause the blood sugar to sink to a dangerously low level (hypoglycæmia). This danger can be guarded against if the patient always carries about with him eight large lumps of sugar (1 or 2 ounces of barley sugar—Macelean) and promptly eats them all if he feels queer after an injection of insulin. Two grams of glucose are supposed to keep busy one unit of insulin; from which it is reckoned that eight average lumps of sugar would act as antidote to 15 units of insulin.

3. Insulin is given two or three times a day, just before a chief meal, which if possible should contain

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1 ounce of bread; 10 to 50 units daily is the usual range of dose; more is seldom useful.

4. The patient can be taught to inject it into the pinched-up skin of the thigh, under weekly supervision.

5. Insulin has to be acid; in a few subjects this causes painful lumps. It is said that neutralization in the syringe by sterile sodium bicarbonate solution of proper strength prevents this irritation and does not impair the action of the insulin.

6. As to blood tests with insulin, these are rarely found helpful, for it is unattainable in private practice to keep the blood sugar normal. You dare not even keep the urine quite free of sugar in insulin cases.

7. The risk of giving insulin in unsuitable cases will be practically eliminated without blood tests (a) if you first try to cure all cases by diet alone; (b) if ketones are present, and abundant sugar, insulin is surely needed; (c) leaky kidneys (renal glycosuria) are a real but uncommon danger. These cases may be recognized by their uncanny failure to improve with diet, by their good health, by the absence of ketones, and by the absence of glycosuria three hours after a good starchy meal. A blood sugar test will decide the matter by showing a low renal threshold for sugar.

8. Ill effects attributable to insulin are rare while the benefits are notorious, but if in an emergency you are nervous of causing hypoglycæmia you can guard the insulin with sugar, as above.

Ketones.

Ketones, such as acetone and diacetic acid, are half-oxidized fats. Their presence in the urine is revealed by the nitro-prusside test or the ferric chloride test; the former is too sensitive and becomes a scaremonger so the latter is preferred.

If the addition of two drops of liq. ferri perchlor. fort. to the urine produces a dark-brown colour then ketones are present in dangerous amount, and must be got rid of, lest coma supervene. Ketones are far more pregnant with danger than sugar, and are often produced by too strict a dietary.

To get rid of ketones, it is often needful not only to give extra carbohydrate, but also give insulin, which has the mysterious property of enabling the diabetic to burn up sugar like an ordinary person. So that if ketones appear, watch for coma, ignore the sugar in the urine, and treat the much greater danger by giving alkalis freely and more bread. And if you find that large doses of alkali fail to make the urine alkaline, then the peril of coma is menacing indeed. Ten grains of sodium bicarbonate should alkalinize a normal urine; so try your ketosis patient with 20 grains. An hour afterwards boil and cool the urine in a test tube and test with blue litmus paper.

There is no time in coma to trifle with half-measures. Hence intravenous injections are needed, starting with 20 to 40 units of insulin, 40 to 80 grams of glucose in 800 to 1,600 c.cm. of water. Then you must feel your way by results, but 80 to 100 units or even more may be needed in the first day. Croton oil, strychnine, and camphor will also probably be indicated.

Exercise.

Exercise in moderation is important in diabetes to help the combustion of sugar to carbonic acid which takes place in the muscles. Gardening is an excellent hobby for diabetic patients, and often makes them look the picture of bronzed and ruddy health. Bed should be prescribed only during starvation or illness.

Method of Domestic Estimation of Urinary Sugar.

The apparatus required is: (1) A urinometer with a long stem indicating clearly specific gravities 1000 to 1050. This, and its glass cylinder, should have a case for travelling. (2) An engineering student's exercise book of squared paper. Its left-hand margin is also graduated 1000 to 1050. (3) A thermos flask, pint size. (4) A pennyworth of yeast, fresh twice a week.

Method.

Every night the specific gravity of the urine is taken when warm. The thermos flask, which has been warmed and cleansed with hot water, is filled with the warm urine; a piece of yeast the size of a small walnut is added and shaken up. The flask is corked loosely (or with cotton-wool) and wrapped in a blanket. Next morning the specific gravity is again taken. It will be less, because all the sugar has been converted by the yeast into carbonic acid gas (mainly). Let us suppose the gravities before and after fermentation were 1040 and 1020. A red dot and a black dot will be placed at their proper heights in the first column of the squared page. Next day another pair of dots will appear in the next column. Thus will be spun out an upper and a lower curve, one red and the other black. The space between these curves represents the excretion of sugar in grains per ounce. The object of treatment is to pinch these two curves together. When they coincide there is no sugar, and it is well to mark these days by a red dot within a circle.

If the morning urine alone is recorded the results will be more constant, more flattering, and less useful. The night specimen is best for a patient who does not always urinate at home. A twenty-four hours specimen is not much better; it is a nuisance to warm, and is only available for the home-keeping patient.

Ketone Test.—Every morning the patient watches two drops of liquor ferri perchlor. trickle down the near side of the urine glass. If it changes from yellow to dark brown the doctor must be informed that day."

Sodium Chloride Treatment for Vomiting.

LEHMAN AND GIBSON in the *Journal of the American Medical Association* of April 25, 1925, record a series of 15 patients suffering from symptoms of reverse peristalsis in the upper gastro-intestinal tract from various causes. All were given amounts of 2 per cent. sodium chloride solution varying from 50 to 200 c.c. In every case there was immediate relief of symptoms, but in several cases the relief was transient.

Nephritis with œdema signifying chloride retention is an important contraindication. An overdose must be avoided in any case on account of the danger of a salt diarrhœa. On account of the popular use of warm saline solution as an emetic it was given cool or cold.

Human Schistosomiasis in India.

By J. P. CULLEN, M.D. (Lond.), D.P.H.

Jl. Trop. Med. and Hyg., Dec. 15, 1924.

"WHILST this article is mainly concerned in calling attention to the fact that *Schistosoma japonicum* constitutes a serious menace to the Indian Empire, I think it is worth while placing on record that since the original case of *Schistosoma japonicum* was discovered by me in the early part of the present year, and attention called to its occurrence in the border territory between Yunnan and the Northern Shan States of Burma, eight further cases have been noted during a period of six months; the first of these cases was treated with antimony tartrate, in what may be now regarded as the orthodox manner, with the result that after a total dosage of 12 grs. ova had disappeared from the faeces, the liver had regained its normal dimensions, and tenderness over the organ was absent, whilst the spleen, which had previously been enlarged to four-fingers breadth below the costal margin could only just be felt below the ribs. Whilst not prepared to say that after 12 gr. of antimony tartrate the man was cured, yet, in my opinion, he was well on the way to recovery when I left the Northern Shan States at the end of September. As regards the remaining cases in this list they were considered to be too far advanced for specific treatment, suffering as they were from emaciation and marked ascites it was also thought

impolitic to lose native confidence by treating hopeless cases.

I wish here to draw attention to the following points:—

(a) That Asiatic schistosomiasis is more widely spread than is generally supposed, or recorded in text-books on tropical medicine. For example, the most recent authorities state, as the result of their questionnaires, that 'the mountainous areas embraced in the provinces of Kiangsi, Kweichow and Yunnan, as well as those portions of the south-eastern coastal provinces lying above the coastal plain, report no cases.'

(b) That accurate determination of the distribution of the disease and of its intermediate hosts is necessary. Personally, as regards Yunnan and the Northern Shan States, it appears to me that the country adjoining the Shweli river affords the most promising field for investigation.

(c) That on location of foci prophylactic measures to prevent the spread of the disease in India are necessary. Such measures to involve close collaboration between the tropical expert and the sanitarian.

Whilst statistics of the extent of the disease in a country like China must necessarily be open to many criticisms, it is worth while noting that Professor Faust estimates that 10,000,000 people suffer from the disease in the Yangtse-Kiang watershed and 20 per cent. of that number die from its direct effects. F. Milton, in a private communication, reports that *Schistosoma japonicum* is probably present on the west coast of India, and the fact that India is not only threatened but already infected on the eastern border is a matter affording grave food for reflection on the part of the authorities concerned."

Endocrine Therapy.

British Med. Jl., April 11th, 1925.

At a special discussion at the Royal Society of Medicine, on March 31st, on endocrine therapy, Dr. W. Langdon Brown said that endocrine therapy might have as its object the replacement of a deficient internal secretion, in which case they were on sure ground with thyroid extract and insulin, on less sure ground with parathyroid and pituitary extract, and on very doubtful ground with other glandular preparations. But it might also have as its object the employment of some extract simply for its pharmacological action, such as adrenaline for its local vaso-constrictor effect or pituitrin for its stimulating effect on plain muscle. He would also include under endocrine therapy the use of other drugs which, by their influence on the endocrine glands, enabled those glands to carry out more successfully their normal function; he instanced iodine medication in diseases of the thyroid. As to methods of administration, apart from thyroid extract and (less constantly) pituitary extracts, the effect of oral administration was very uncertain. Nasal administration had met with a certain degree of success in the treatment of diabetes insipidus, by pituitrin. Of rectal administration very little was known. By subcutaneous or intravenous injection, adrenaline, pituitrin, and insulin could readily produce powerful effects. Grafting and transplantation methods were still on their trial. It would appear that such grafts were treated by the organism as foreign bodies and became absorbed, so that their effect was only temporary.

His conclusions were that thyroid medication had the widest application of all the endocrines and was the easiest in practice. Parathyroid extract he had found of great service in tetany and gastric ulcer. Adrenaline was of little if any use in substitution therapy; it was of great use for its local effect on blood vessels and for its effect on plain muscle. Pituitary extract was of doubtful value, though it might occasionally alleviate Fröhlich's syndrome and adiposis dolorosa. It was useful in asthma and as a temporary cardiac stimulant. Insulin was of proved value in diabetes, and here he protested against

the statement that if insulin was once given it must be continued for the rest of life. He had a number of patients who came under early treatment with it, and who were keeping free from glycosuria, with a normal blood sugar, although insulin had been discontinued for periods varying from three months to over a year. The existence of an ovarian hormone he regarded as proved, and it should not be beyond the wit of man to prepare a reliable extract. It was doubtful whether the present commercial preparations were active, but he had seen great benefit in thymic asthma and in a case of epileptiform seizures accompanied by temporary swelling of the thyroid. In conclusion, Dr. Langdon Brown said that he doubted whether any orchitic extract was effective.

Professor Swale Vincent declared that the present boom in endocrine therapy was an evil of the same general nature as the indiscriminate sale of patent medicines. But whereas in the latter case it was the members of the general public who were so continually duped by the vendor of the drug, in the former the distressing spectacle was to be witnessed of hundreds or thousands of medical men being cajoled into prescribing preparations which were nearly always of doubtful value and were often quite inactive in health or disease.

He asserted that in the case of the great majority of these preparations there was no evidence that any effects whatever were produced when they were given in the ordinary way by the mouth—unless in such quantities as to serve as foods!

Discussing certain preparations singly, he said that, of course, there was no need to emphasize the value of thyroid preparations in myxœdema and cretinism. In lesser degrees of hypothyroidism and in rheumatism, rickets, mental diseases, and other conditions these preparations might also be useful on the general principle that a drug which stimulated the chemical activity of the whole body might be applicable in a variety of morbid conditions. The results of parathyroid medication were still very uncertain. Commercial preparations of ovary and parathyroid at present on the market were, according to the majority of competent observers, physiologically inactive, and in all probability useless as therapeutic agents. It had never been demonstrated in a satisfactory manner that treatment by pituitary extracts had any effect in remedying the symptoms thought to be due to pituitary insufficiency. Posterior lobe preparations were useful as drugs in the treatment of diabetes insipidus and to aid contractions of the uterus, but these uses had no relation to any known function of the organ, and were not instances of a substitution therapy. Physicians who continued to prescribe preparations for the use of which there was no scientific basis and no sound clinical evidence were guilty of conduct unworthy of modern medicine.

Mr. Kenneth Walker confined himself to discussing the therapy of the testis. The effort to obtain results from the oral administration of testicular extract had failed, and this had led to the use of testicular grafts. He referred to the work of Voronoff, who had now made some fifty or sixty transplants into the human subject from the higher apes, and claimed to have obtained valuable results. The grafts had been undertaken for various conditions—eunuchoidism, senility, neurasthenia and sexual neurosis—and the chief benefit was said to be in the direction of improvement in the general health, increase of mental and muscular vigour, and stimulation of hair growth. Improvement was less definite in cases grafted for impotence or sexual neurosis. Other workers in this field had preferred to use human transplants, and had derived their material from newly executed criminals, patients dying of accidents, the cases of ectopia testis in which the removal of the misplaced organ was justified. It was from this last source that the speaker had himself obtained his grafts. The technique of transplantation was not difficult. Personally, he thought that Voronoff's use of a serous cavity like that of the tunica vaginalis for

implantation was the best. Mr. Walker believed that vascularization and survival of the graft was an actual fact. At the same time, a steady atrophy of the engrafted material no doubt occurred, and the actual life of the transplant was, he thought, considerably shorter than that claimed for it by Voronoff. He would feel happy if he could be sure that complete atrophy did not occur within eighteen months. This, however, did not necessarily mean that at the end of that period all benefit was lost. A graft might stimulate the growth of existing testicular tissue or the hormone supplied by the graft might tide the patient over a critical period until compensatory changes in other endocrine glands succeeded in restoring the endocrine balance. In conclusion, he said a few words about vaso-ligation as a means of stimulating the activity of the testis. Those familiar with Steinach's experiments on aged rats must certainly be impressed by the results of vaso-ligation. In human beings the results of the operation had been less certain. In many cases there had been no benefit; in some the general health and mental vigour of the patient had improved, and in a few cases the results had been still more striking. The speaker had performed Steinach's operation in some fifteen cases, and, although it was difficult to eliminate the element of suggestion, he believed that in at least half of them an improvement in general health and mental vigour had taken place. He was particularly inclined to recommend the operation in the treatment of that hopeless malady of later life, paralysis agitans.

Sciatica.

A New Method of Treatment.

By CHARLES ROSENHECK, M.D.,
and

HARRY FINKELSTEIN, M.D.

Jl. American Med. Assoc., March 28th, 1925, p. 939.

Varieties of Sciatica.

In a previous study on the treatment of sciatica by perineural infiltrations and epidural injections, we classified sciatica as follows:—

Class 1.—Symptomatic or pseudo sciatica: due to recognizable infections, toxemias, constitutional diseases, exposure to sudden temperature changes, pelvic disturbances and organic nervous disease.

Class 2.—Orthopedic sciatica: an arbitrary division due to recognizable orthopedic conditions; viz., spondylitis deformans, lumbosacral, sacro-iliac subluxations and disease and affections of the hip joint.

Class 3.—Sciatica neuritis.

We have since learned that Sciatic neuritis is common end-result of the so-called "orthopedic sciatica," and in practically all the cases observed the underlying orthopedic affection was sacro-iliac disease—either traumatic or infectious.

The pain does not help us in differentiating the pseudo from the true form of sciatica, since this symptom is present in both conditions. Certain well-defined objective phenomena assist in arriving at a conclusion. In the order of their importance they are:—Tenderness along the course of the sciatic nerve; tension or stretching the nerve, thereby inciting pain, as in the well-known Lasague manoeuvre; flexion attitude of the involved limb; muscle hypotonia or atrophy, and scoliosis of the lower spine. Separate mention should be made of the depression or abolition of the Achilles' reflex, since this sign is a most valuable one, indicating—in the absence of cord disease—a degenerative process of the sciatic nerve; in other words, a true neuritis.

The treatment of the pseudoforms implies the detection of a wide variety of affections that may be responsible for the sciatic pain and the proper therapeutic applications to these underlying affections. The therapeutic task in the so-called "orthopedic sciatica" is a relatively simple and uniform affair as contrasted with those cases that occur from conditions of a widely diverse aetiology.

The method of epidural injections found instant favour and was extensively used by the French; but the majority of patients were soldiers exposed to the rigors of warfare and trench life, and in whom an infectious radiculitis of the sciatic roots was postulated.

In the light of these facts, one can readily understand the ready response of these cases to injection therapy. scant reference is made of cases of sciatica of orthopedic origin. Evidently foreign observers consider the relation between orthopedic affections and sciatica a minor one.

The authors' treatment is somewhat according to the type of case.

In Static Cases.—These are recognized by weak feet, hollow lumbar spine, pendulous abdomen, general lack of muscular tone, and vague sciatic pains. Supportive measures are best in these types, including proper orthopedic shoes, elevated on the inner side, and corsets constructed to support the relaxed or pendulous abdomen and to diminish the lumbar lordosis. Preference is given to the plaster-of-Paris corset, applied in a Sayre suspension apparatus, which can be changed in several days to an open corset, added corrective force being obtained by excising a 1 to 2 inch strip in front, inserting hooks and lacing tightly. This is augmented by instituting massage, electricity and graduated exercises to the weakened feet, and the abdominal and spinal muscles.

Traumatic Cases (acute).—These are recognized by sudden onset following injury direct or indirect, pain usually in one sacro-iliac region and extending downward along the course of the sciatic nerve, flattening of the lumbar spine, listing to one side, Kernig's sign, etc. This group is treated by rest in bed and support beneath the lumbar spine and the affected knee, followed by strapping the back with adhesive plaster or preferably by a plaster jacket as previously described, forcing the spine into hyperextension.

Chronic Cases.—These include the previously mentioned types that have not responded to the treatments described. This group, in spite of conservative methods of treatment over a prolonged period, fails to respond in the slightest degree. It is recognized by a chronic course with frequent acute exacerbations, intense suffering, weakness in the lower spine, severe sciatic pains, spasm of the lumbar and hamstring muscles, and coliosis. These patients are destined to prolonged invalidism, and cannot pursue their vocations. In this group the treatment *par excellence* is the manipulative treatment of Baer and Cofield. The technic of the operation is as follows: The patient is placed on a solid, non-movable table, flat on his back, and is anesthetized to the point of complete muscular relaxation. Two assistants firmly hold down each side of the pelvis. The operator grasps the unaffected limb with one hand in front of the knee, the other above the heel. The hamstrings on the normal side are usually found slightly contracted. Gradually increasing force is then exerted in an anteroposterior plane, all rotary movements being avoided. This force is continued until the hamstring tension is overcome—Kernig's sign being negative. The affected limb is then grasped, in which the hamstrings are usually found in a state of marked contraction. Force is now exerted in an anteroposterior direction until the toes are approximated to the shoulder of the same side. Usually a distinct click is heard, which is a signal that the muscles have been sufficiently stretched.

Following the complete stretching, a stockinet shirting is applied, and the patient is turned face downward across two tables about 3 feet apart, one assistant holding the legs, the other the shoulders; the operator forces the lumbar spine into complete hyperextension, and pressure is exerted over the affected sacro-iliac joint. Felt padding is inserted, reaching from the mid-dorsal region as far down as the great trochanters, and a strong plaster jacket is applied, the hyperextension maintained by two bent steels. When hardened, the plaster is trimmed and the patient returned to bed either in the prone or the supine posture—in the latter

position, a pillow being placed under the lumbar curve. This case is worn for about two weeks, and on removal either a short open plaster jacket is substituted or a sacro-iliac corset. The latter should be worn for protection at least a year, the patient being warned to avoid undue muscular exertion.

The after-treatment consists of baking, massage and graduated exercises to increase the muscular tone. The results of this method of treatment are exceedingly gratifying. Baer states that in 100 cases manipulated, immediate relief was obtained in almost every case, there being only three relapses. The authors' observations in a similar series show favourable results in all cases of sciatica due to static disturbances or traumatic lesions of the sacro-iliac joints. The sciatic pains are relieved in from twenty-four to forty-eight hours. On only two occasions was an additional stretching (under anaesthesia) necessary. In early cases, there was a tendency in about 25 per cent. of the cases for the hamstrings to recontract, with occasional recurrence of sciatic pain. Since the procedure of forcibly stretching the affected limb daily, following operation was instituted there have been fewer relapses.

Inflammatory Cases.—Sciatica due to inflammations of the sacro-iliac joints, lumbosacral joints or lumbar vertebrae do not respond to this method of procedure, and account for a few failures. In fact, the symptoms are often aggravated by forcible stretching. The proper method of treating these patients consists of rest, support to the spine, removal of foci of infections, anti-rheumatic medications and local treatments, such as baking and high frequency currents with cataphoresis. Those failing to respond are best treated by ankylosing operations. The contra-indications to the manipulative treatment therefore are: (1) inflammation of the spine; (2) tuberculosis of the spine; (3) fractures or dislocations, and (4) tumors (cystic or malignant).

The danger of fracturing or dislocating the femur is overcome by stretching only in an anteroposterior plane, avoiding rotary force. Care should be taken to exclude such possibilities as cysts, tumors or osteoporotic diseases of the bones of the lower extremities and spine.

Attention must again be called to the possibility of traumatic palsies following stretching or manipulation. Two such instances have been observed.

The Indian Medical Service.

The Medical Press, August 5, 1925, p. 120.

THE EARL OF BIRKENHEAD, Secretary of State for India, said in reply to Lord Sydenham in the House of Lords on Thursday last, that the Indian Medical Service and its organisation had always been a matter of extreme difficulty. It was at the same time a military and a civil service and the interests of the two branches had not always been the same. The 1919 reforms had introduced further complications, and it must be made quite clear what were the obligations which were laid on the Government by the Government of India Act, and the statutory rules made under it. Generally speaking the civil medical administration in India included hospitals and public health, and the provision for medical education, and these were all transferred subjects, the responsibility for which rested with the provincial governments, and the Secretary of State had divested himself of the powers in regard to them which he formerly exercised. The Secretary of State would no longer undertake to recruit officers for the provincial civil medical administration in India, or in particular for the civil hospitals as such, nor could he assume responsibility for the medical care of British non-official residents in India. He had received recommendations from the Government of India on these matters and their consideration was well advanced in his department, but he was not yet in a position to indicate his final decision. He could, however, say that the Indian Medical Service would be retained. It would be essentially a military service, but officers would be lent to the civil administration. It was of the

first importance whether a service on these lines would attract recruits of the right class. He thought that the research and professional appointments which had always been one of the attractions of the Indian Medical Service would help in this respect. He was hopeful that a solution would be found on these lines which would appeal to the medical profession in Great Britain and Ireland.

Report of the Fourth Session of the Health Committee of the League of Nations held at Geneva, April 1925.

SOME very important work was put through during the eight sittings of the Committee. The following reports by officers and the special commissioners of the Committee were received and discussed:—

Report of Dr. Gilmour on Health Conditions in Persia.

Report of Dr. Haigh on Health Condition in Albania.

Revision of the International List of Causes of Death.

Report of the Opium Commission.

Report of the Commission on Instruction in Public Health.

Report of the Cancer Commission.

Abuses arising from the use of Patent Medicines.

Report on the work of the Far Eastern Commission.

Letters from Japanese and Dutch Governments regarding draft International Convention for the Far East.

Report of the Tuberculosis Commission.

Report of the Malaria Commission.

One of the most interesting innovations by the Health Committee has been the arrangement for interchange of visits of health officials between various countries. Two delegates from India will shortly visit Japan to study the Japanese system of public health work. In Europe a great number of interchange visits have already taken place.

The Committee endorsed the work of the Far Eastern Commission and agreed to establishment of the Singapore Bureau of Epidemiological Intelligence.

The report of the Malaria Commission showed a wide field of activity and will be reviewed separately. As a result of the work done by this Commission numerous applications for further assistance are being received from various Governments.

The Tuberculosis Commission is investigating the question of the alleged diminution of the disease and possible causes thereof. No reports are yet ready.

The Cancer Commission has collected a vast supply of data regarding incidence and malignancy of cancer by nationality or race, locality, civil state, age and natality. These data are to be statistically treated.

The work of the Health Committee is one of the most fruitful outcomes of the establishment of the League of Nations. The Committee is financed by a generous grant from the budget of the League and can maintain a body of whole time expert investigating officers and also provide funds for the expenses of commissions. Its value as a "liaison" office is immense.

Office Internationale D'Hygiene Publique Proces verbaux des Séances, October 1924.

THE sittings of the Permanent Committee of the Office Internationale are peculiar in that no resolutions are ever carried. The various subjects brought up are discussed and argued and when everyone who wishes has spoken the next subject is taken up. Therefore from the printed copy of the proceedings it is not always easy to find out what was the general sense of the meeting. The reviewer was present at this particular session. Replies to questions raised were read from various Governments concerning the adoption of a legal international standard for antisera such as anti-diphtheritic and antitetanic. All Governments agreed to accept an international standard but many (including

India) objected to the introduction of legislation on this point.

Replies to questionnaires regarding:—(1) A model Bill of Health for ships; (2) Treatment of sailors for venereal disease at foreign ports; (3) Possibilities of hematological examination of pregnant women for syphilis were read and recorded.

The second day was occupied in yet another discussion on the revision of the International Sanitary Convention of 1912. This Convention is long overdue for revision and the various articles have been under discussion for the past four years. Agreement is all but reached and it is hoped to hold an international conference of delegates from all signatory nations in November 1925.

On the fifth day a somewhat lively meeting took place in which the delegates from the British Dominions, India, Australia, Canada and South Africa took exception to the activities of the Health Committee of the League of Nations on which there is only one delegate from the whole British Empire. The discussion that took place showed that the Office Internationale had no intention of playing second fiddle.

Papers and discussions of great interest took place on:—(1) Rodents and their parasites. (2) The relation of pneumonic plague to bubonic plague and the recognition of a separate aetiology for the first named. (3). The incidence of tabes and general paralysis as influenced by modern treatment of syphilis. (4). Scarlet fever which for some cause is lessening in severity in most of its endemic homes except Italy where its virulence has increased.

Infantile mortality, rhinoscleroma, sleeping sickness and tuberculosis in Africa were debates of interest. A lively discussion took place as to whether 'alastrim' or white pox should be recognised as a separate entity. The Committee seemed evenly divided on this point.

Other discussions were on goitre in Switzerland and its relation to cancer of the thyroid, the treatment of leprosy and kala-azar.

The report is brimful of interesting debates by delegates of 55 nations. It is written in French.

Report of the Malaria Commission of the Health Organization of the League of Nations, Geneva, March 1925.

THIS report begins with a "Summary of Impressions of the Tour" for which the Commission as a whole accepts responsibility. The statements and opinions in the separate reports relating to the various countries visited are those of the particular authors who have written those reports.

The area dealt with may be described as South Eastern Europe extending from Italy on the west to the Volga region of Russia on the east.

The first conclusion arrived at is the necessity of making a distinction between the characteristics of endemic malaria and those of epidemic outbreaks. In India we have recognised this necessity long since for the aetiological factors governing such fulminant outbreaks as the Punjab epidemic of 1908 are entirely different from those governing endemic malaria in deltaic Bengal and the submontane valleys of India.

The Commission debates whether the policy shall be concentration of effort in the prevention of particular diseases or whether to devote attention to general hygiene—public health conditions such as housing and education. The Commission note that while malaria is no doubt a disease of great importance it is not always easy to decide what rank it takes among different causes of sickness and death. This is a problem of greatest importance in India. It has been openly said in the British Parliament that malaria causes 1½ million deaths a year in British India. Malariologists in India have assumed that possibly one third of reported deaths are directly or indirectly due to malaria. In Bengal the reviewer accepted this figure and repeated it in 1911. It is pure hypothesis. There is little evidence available

and in view of increased knowledge of other causes of death, notably cholera, phthisis and kala-azar, compared with the few cases of fatal malaria seen in hospitals it is possible that this mortality is grossly overstated.

A truer estimation of mortality and morbidity from malaria in India is badly needed and consideration whether purely anti-malarial schemes are called for.

The Commission states that the following primary measures are indispensable:—

(a) The thorough treatment and after-treatment of all cases of malaria.

(b) The discovery and treatment of "carrier" cases by house to house and school inspection using spleen and blood examinations.

(c) Teach the inhabitants how to use mosquito nets and how to catch and kill those mosquitoes which find a resting place in houses.

The report says:—

"In view of the overwhelming importance of destroying domestic mosquitoes—that is to say, those which have gained access to living rooms which have had the opportunity of becoming infected and which will within a short period become the real and dangerous factors in spreading the infection—it would appear that along this line lies the simplest, most direct and perhaps also the easiest and least costly method of at least staying the malaria problem in rural areas."

This is the first time that the reviewer has seen anti-adult measures put in the front rank. In Panama it was considered a valuable accessory only. Increasing value given to this procedure is a feature of modern writers.

In addition the Commission emphasises that in certain limited and carefully selected areas conditions may be favourable for the adoption of measures directed against anopheles larvæ and anopheles adults in general. They do not recommend prophylactic issue of quinine except in carefully controlled conditions.

Of the individual monographs that of Professor Swellengrebel's is the most interesting and important.

Professor Swellengrebel in his report of Italy calls attention to the false idea held outside Italy of the nature of Italian "major bonification" schemes. Many of these the Italians had in operation before the connection of the mosquito with malaria was traced and they are all primarily designed for the creation of rich agricultural areas whereby the economic conditions were improved, the enhanced well-being reflecting favourably on the general resistance of the population to various diseases and to malaria in particular.

He writes of Italy:—

"We saw that even in well kept bonifications where malaria has been much reduced larvæ still abound in ditches (round Ferrara) and anophelism is not less; and that near bonifications where an intensified anti-larval campaign is being carried on anopheles abound in houses and stables (Ostia). The effect of small bonifications—as in Holland so in Italy—was practically nil, as a reducer of anophelism and the visit taught anew that the hygienic value of a bonificazione is identical with its economic value. The assertion is not true that Italy lays more and more stress on anti-larval measures to be performed on a large scale. This assertion if believed would lead to a deplorable waste of time, money and energy in other countries."

This opinion of Professor Swellengrebel's is fully endorsed by the Commission. (Section V "Measures of improvement," p. 59).

The opening paragraph of the 3rd section of the report on "Measures concerning Man" is as follows:— "Almost universally the Commission finds that the treatment of patients by quinine is the basis of the anti-malaria campaign; and justly so in view of the alternative, the long and costly effort called for to wage a really victorious anti-anopheles war."

The conclusions of the Committee represent the very latest views of European expert observers and the report needs most careful study by all malariologists in India.

The principal measures advocated are quinine treatment of the infected sick combined with improved economic conditions whereby malaria ceases to be a widespread cause of mortality and morbidity and is reduced to the status of one of the minor ills to which flesh is heir.

Crippling due to Fractures.

In a lecture reported in the *British Medical Journal* of May 16th, 1925, Sir Robert Jones deals with the deplorable degree of crippling which so often results after the treatment of fractures. He attributes the failures to a lack of proper training in the handling of fractures and appeals for the establishment of special fracture clinics in all the teaching hospitals. He points to the vast improvements which took place in the handling of fractures in the later stages of the war, the mortality of the compound fractures of the femur having fallen from 80 per cent. in 1916 to 20 per cent. in 1918 owing chiefly to the early application of the Thomas splint. In other fractures greatly improved results were obtained by expert supervision, simplification of apparatus, team work, segregation and appropriate after-care.

He claims that similar improvements could be obtained in civil practice. His remarks on the common mistakes in dealing with fractures are so important that they are reproduced almost in full.

Common Mistakes.

Although an end-to-end apposition of a fracture is desirable, it is not essential to perfect function. Indeed, the ill effects following fractures are often due to injury to the soft parts, as may be instanced by ischaemic palsy and injuries to nerves. An end-to-end apposition with imperfect deflection of body weight is infinitely more serious than a slight overlapping, where body weight falls in correct line. In dealing with fractures of the shafts of long bones the first consideration, is to secure a true anatomical alignment of the bone, so that the axis of movement of the joints at the two ends of the bone may retain their correct relative positions. Many crippling deformities are due to a want of recognition of this fact.

Again, let us instance the femur. It is a common experience to find elderly persons, whom the hospitals were unable to treat, handicapped by the extreme disabilities which follow fracture of the neck of the femur. The limb is shortened, adducted, and rotated outwards, and yet quite a large proportion of such cases simply but properly treated would have resumed their useful citizenship. Abduction and inward rotation under extension would have secured in the limb a range of movement which would have more evenly distributed the pressure of the head in the acetabulum, while later a weight-bearing splint would have prevented the shortening. Again, how common a thing it is to meet with an old case of fracture of the upper third hobbling with a shortened and adducted limb, his body weight so deflected as to strain both hip and knee. By a simple manipulation and fixation this catastrophe could have been avoided. Or it may be a fracture of the middle of the femur with lateral or antero-posterior angulation, with which any practitioner could have dealt if his tuition had been effective. The lessons of the war should have impressed everyone with the knowledge that a femur in good alignment while recumbent would almost surely become crooked if walked upon without weight-bearing protection. Or take that most common and distressing deformity following a fracture of the lower third of the femur due to sagging at the seat of fracture, and resulting in a genu recurvatum. A piece of bandage used as a sling under the seat of fracture should easily prevent such a deformity.

Such deplorable results are frequently found. Every excuse but the right one is offered. A common one is muscular spasm. My experience in the treatment of fracture is that if muscles are sufficiently controlled they

come to rest and cease to struggle, but that if the control is inefficient or intermittent then reflex movements are active, and that all muscles enervated from the same region share more or less in the excitability. How commonly we see a knock-knee following a fracture of the lower third of the tibia. This is generally due to the common practice of setting a fracture of the tibia as if it were a straight bone; we place a pad on the inner side of the ankle in such a way as to obliterate the normal curve. But of all fractures which are badly managed that described by Percival Pott is the most common. A distinguished hospital surgeon, who looked after the London police, stated once that he had never known a police officer who had sustained a Pott's fracture return to his full duty. This statement is a notable testimony to the inefficiency of routine hospital treatment, for most of such fractures are taken direct to our teaching centres. As we all know, a Pott's fracture exhibits a dislocation backwards of the foot, together with eversion. We constantly find the unreduced dislocation as an end-result; yet this dislocation is never difficult to reduce provided the method has been taught. The reduction of the deformity should be undertaken at the earliest possible moment, although it can often be accomplished by manipulation at any time under three weeks. Every student should be taught that the knee should be fully fixed, the heel pulled forwards, and the lower end of the tibia simultaneously pushed backwards. The reduction is usually accompanied by a click, which is heard and felt as clearly as in the reduction of a dislocated shoulder. The foot should be fixed in inversion. Even if the bones are restored to their normal relationship eversion will recur later unless during standing and walking body weight is deflected to the outer side of the tarsus.

In the upper extremity, how common it is to find a stiff elbow following a fracture just above or through the joint, and this sometimes in spite of complete flexion. Failure to reduce the fracture accurately is generally the cause of this. It is not enough to take hold of the arm and merely to flex it. It should first of all be supinated, then extended and pulled, and while the upper end of the fracture is pushed back, the forearm should be pulled forwards and flexed. A student should be taught this manipulation, for it will save him many a serious disappointment. The application of the internal angular splint is happily becoming less frequent. It is a pernicious method. The advantage of the manipulation described is invaluable to the practitioner, for it is applicable to most fractures of the elbow, and indeed to dislocations also.

Avoidable Complications.

The growing tendency of the immediate application of plaster-of-Paris assumes the immediate and complete reduction of a fracture, which is not always possible. It prevents the intelligent use of pads, and does not allow of inspection and supervision. Unless applied by an expert it often tends to interfere with the vitality of the limb because of circular compression. If put on a limb newly injured it will become slack as soon as the swelling subsides. It does not permit of massage, so often necessary to hasten recovery. In spite of this, circumstances may arise where the application of plaster is the only available procedure. No student should be allowed to leave his hospital until he is familiar with the modern methods of applying plaster. A badly applied plaster often proves a very dangerous splint, and is a common cause of non-union and of pressure sores.

The student is not sufficiently warned against the pressure slough, nor the best ways of avoiding it. A slough may occur in twelve hours or less if plaster is placed over a thinly clad bone, and while developing give rise to nothing more than discomfort. Deep sloughs occur without any complaint having been made by the patient. This type, which occurs without pain, is generally the worst, the pressure over bone having benumbed the skin from the first. If, therefore, it becomes imperative to employ pads on such places they should

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be examined and changed frequently, despite the fact that the patient may be feeling very comfortable.

Granted a fair apposition, non-union rarely occurs. It is generally the result of nervousness and impatience. Some surgeons are never content unless they worry the fractured ends week after week to see how consolidation proceeds. Such procedure is as unscientific as the action of a cook who opens her oven door every five minutes to see how the hot-pot progresses. Until the normal period of completion of consolidation, absolute rest should be ensured. A fracture of the shaft of the tibia may take many months to unite.

After-treatment and Protection.

The student is not taught the length of time restraint should be continued nor the nature of after-care. Even to-day, text books do not instruct him as to when he may reasonably expect complete consolidation. The result is that a patient may leave a surgeon with a limb of normal form and length, and in a few weeks it may be short and crooked. It cannot be too clearly emphasized that a lower limb which can pass the test of a manual examination may completely fail when body weight is superimposed. Adequate protection should therefore, always be given to a fractured limb when walking is prescribed. In spite of a well equipped physiotherapy department attached to the hospital, how few students are able to give intelligent instruction to a masseuse, or to direct a gymnast in treating a deformity, or show an electrotherapist the muscles he should stimulate in order to overcome weakness. The instruction generally given is, "Have your arm massaged," or "Use the faradic current," or "Give exercises to this man." We blame the physiotherapists if they do not carry out the doctor's instructions; we do not dwell on the fact that the doctors—with few exceptions—do not possess the knowledge to instruct. Surely there is something radically wrong with a syllabus which leaves the students ignorant in matters of such practical importance. It is an open invitation to every species of quack.

How few students have been taught to distinguish between a joint which may be moved and one which should be kept at rest—and how many bitter disappointments result from this. How few men know how to handle a fracture; how to hold the broken arm with a *minimum of pain*; how to feel for crepitation; how to avoid muscular spasm; how to reduce deformity, and, as it has been called, "set" the fracture. A surgeon, who is interested in his subject, and knows it, will teach the student more by demonstrating one case than can ever be learnt by the student in personally handling twenty cases in a spirit of adventure. The student should be taught to use his eyes, his measuring tape, and the art of reducing a fracture almost painlessly by postural muscle relaxation. Such an education in manipulation is worth any amount of untutored experience. The rough handling of fractures by the unskilful is an outrage on a patient, and when done in the presence of a student is an extremely bad example. A malunited fracture cannot be cured merely by an operation; all the operation can do, is to reconstruct the fracture, and a satisfactory result can only occur by the maintenance of the alignment until consolidation of the bone is complete.

The Choice of Splints.

Sir Robert emphasized the urgent necessity there is for each hospital to scrap its useless splints and retain for teaching purposes only those of known efficiency. Hospital staffs should, from time to time, meet and select the most useful—and they are generally the simplest—splints, and no students should graduate unless he has completely mastered their correct application. Furthermore, in order to simplify the training and to stabilize the examination of the students, this idea could be extended by the formation of a committee, representative of all teaching hospitals, to decide upon the best type of splints.

The Decline of Litholapaxy.

By ALFRED HOOTON, C.I.E., M.R.C.S., L.R.C.P.
British Med. J., April 11th, 1925, p. 690.

GENERAL HOOTON protests against the tendency to regard litholapaxy as an obsolete operation.

The chief arguments now brought against it appear to be that suprapubic lithotomy can be done with nearly as great safety, that litholapaxy is difficult to learn and dangerous when performed by inexperienced operators, and that there are more recurrences after it than after lithotomy.

The impression is widely prevalent in India, that litholapaxy in skilled hands is much the less dangerous operation and our figures speak for themselves, and still more emphatically if it is admitted, as we all contend, that, contrary to the impression at home, our cases on the average are far less promising than those which come to the English hospitals. We have a very large proportion of large stones and septic bladders to deal with, and we consider, moreover, that the idea which seems to prevail at home that Indian patients in general bear operation better than Europeans is entirely erroneous. It remains to be said that suprapubic lithotomy is not without its dangers.

The frequency of recurrence after litholapaxy is much exaggerated. Under proper conditions recurrences should be very rare. A fair test of the general result of the operation is its reputation with the public. The Indian cultivator, who furnishes the great majority of our up-country patients, is an acute judge of the practical results of surgery, as shown, for instance, in his appreciation of Bassini's operation for hernia. As regards litholapaxy, he made up his mind long ago, and there is no surer way of emptying one's hospital than by reverting to a cutting operation where crushing has formerly been in vogue. There is not only the escape from the knife but the early discharge from hospital to be considered, and it is, of course, quite common for children who have been relieved of small stones by the lithotrite in the morning to be running about in the afternoon. It is the opinion of an overwhelming majority of Indian surgeons that litholapaxy in proper hands has great advantages over any of the cutting operations in all but a small percentage of complicated cases, and it would be a very great pity if the contrary view were to be generally accepted and taught in the British schools, particularly in the case of men who are destined to practise in the East. A list of cases treated in four representative hospitals of this Presidency is afforded. Two of these are reproduced.

I.—Cases operated on by Lieutenant-Colonel R. W. Anthony, F.R.C.S.I., during three years and three months in 1920-23 at the Civil Hospital at Hyderabad, Sind.

Cases. Deaths.

| | | | |
|---|----|-------|----|
| Litholapaxy (including 30 perineal litholapaxies) | .. | 1,253 | 7* |
| Suprapubic lithotomy | .. | 11 | 3 |
| Perineal lithotomy | .. | 0 | 0 |

* Three others "discharged otherwise"—probably died.

This is the most noted centre for vesical calculus in this Presidency, and has dealt with an average of 464 cases a year during the last ten years. Colonel Anthony says that he looks on every case of stone as one for litholapaxy if it can be done, and that there are very few cases in which it cannot, given an experienced operator. If it is impossible to crush by the urethra in the ordinary way he performs perineal lithotomy. He crushes stones up to about 6 ounces, and hardly ever gets one that he cannot deal with, either by the ordinary on perineal route, by means of a large lithotrite or a hammer. He apparently never does perineal lithotomy now, and only performs suprapubic lithotomy primarily from choice in patients with enlarged prostates. Thus, as he points out, his suprapubic cases must be taken largely as failed litholapaxies of a complicated nature—for example, cases in which the bladder has an hour-glass shape, or processes like the finger of a glove containing stone, or encysted stone; or those rare accidents

where the lithotrite has jammed, or perforation of the bladder has accidentally occurred.

II.—Cases operated on by Lieutenant-Colonel T. S. Novis, F.R.C.S., at the Jamsetjee Jeejeebhoy Hospital, Bombay, from June 14th, 1920, to December 31st, 1923.

| | Cases. | Deaths. |
|----------------------------|--------|---------|
| Litholapaxy | 114 | 1 |
| Perineal litholapaxy | 0 | 0 |
| Suprapubic lithotomy | 17 | 5 |
| Perineal lithotomy | 2 | 0 |

Note.—Of the deaths from suprapubic lithotomy, two were complicated with prostatectomy, and two developed pneumonia.

This is the chief general hospital in Bombay, and associated with the Grant Medical College. Here, also, litholapaxy is the routine operation, the contraindications quoted by Colonel Novis being very large or very hard stones, very soft putty-like stones, stricture, enlarged prostate, extensive kidney disease, and bladder growth of any considerable size. He lays stress on a routine cystoscopic examination of the bladder, both before operation, to exclude the possibility of encystment of the stone or other complications, and immediately after, or at any rate before discharge, to make sure no fragment is left behind. The series quoted includes two cases of hæmorrhage, in both of which suprapubic cystotomy had to be performed, and in one an extraperitoneal rupture was found to exist. Both these recovered. Here also the suprapubic cases are the worst and cannot be quoted for purposes of comparison.

A Method of Treating Infected Ulcers.

By S. A. PFANNENSTILL, M.D.,

Late Chief Physician of the Municipal Hospital, Malmö, Sweden.

Brit. Med. J., April 18th, 1925, p. 732.

In the case of an ulcer on the surface of the body or the limbs sodium iodide is given in an average dose of 15 grains two or three times a day. Larger doses may be given, 60 to 90 grains a day, the effect of the treatment then being greater; but this entails some risk of iodism. Immediately after the first dose of sodium iodide the local peroxide treatment begins. The ulcer is covered by a layer of cotton-wool, not too thick, which is kept continually soaked with the peroxide solution dropping from a dropping-phial every tenth or fifteenth minute, or even more frequently. The more thoroughly the wool is soaked with peroxide the greater is the effect obtained. The strength of the peroxide solution must be kept at 1 to 3 per cent., generally 1 to 1½ per cent., because stronger solutions often irritate the sound skin around the ulcer. An addition of ¼ to ½ per cent. acetic acid will prove quite sufficient for acidifying.

Since the blood contains most sodium iodide about one to two hours after its administration, special attention should be devoted during that time to the thorough soaking of the ulcer with peroxide solution. After the last dose of sodium iodide has been given for the day the local treatment of the ulcer should be continued for at least three to four hours in order to make full use of the iodide which is still circulating in the blood and will be gradually excreted by the kidneys.

When the ulcer has invaded the deeper tissue layers, forming pockets, it is necessary to tampon the pockets loosely with gauze in order to bring the infected walls of the ulcer into intimate contact with the peroxide solution dripped on the gauze. Infected cavities in bones and joints are to be treated in the same manner. Fistulæ, however, usually cannot be directly treated, it being difficult, or even impossible, to conduct the peroxide solution in sufficient quantity through the narrow ducts. It cannot be repeated too often or too strongly emphasized that the efficiency of the method depends upon there being an intimate and prolonged contact between fresh hydrogen peroxide and the infected surface to which sodium iodide is being carried through the

blood vessels. A surgical operation will sometimes make a fistulæ suitable for this treatment.

For treating ulcerations in the nose the nasal cavity must be loosely plugged with gauze upon which the peroxide solution must be dripped as before indicated, care being taken that the patient's head is held back so as to enable the liquid to flow up into the nose. In treatment of affections in the mouth and throat the method of applying the peroxide solution must be changed. In the case of the mouth it is usually sufficient to rinse it frequently with peroxide at intervals of a quarter of an hour or less. For treating the throat a spray apparatus is necessary; different types are on the market, some being driven by compressed air. When hydrogen peroxide is being used for treatment of affections in the mouth and throat it must be remembered that it is impermissible to make the solution acid with the common acids, lest the teeth should be injured. The only acid suitable is boric acid, this being inoffensive to the teeth and quite effective in a 1 per cent. dilution.

The efficiency of this method of treatment is due to the antiseptic agent, iodine, being generated in the nascent state locally; it operates at a deeper level in the infected tissues than do other antiseptics, the iodine being generated not only on the surface but also at some depth under it.

The method has been employed in common infected ulcers and tuberculous ulcers, but since its application is less convenient than the usual methods of treatment it should be reserved for serious cases, in which these latter methods are less efficacious, such as phagedenic chancre and infection in open joints and bones. The method has proved very valuable in treating infectious conditions and ulcerations in the mouth and pharynx, such as mercury stomatitis, pyorrhœa, gingivitis, and angina necrotica (Vincenti).

The method has been frequently employed in treating tuberculous and lupoid ulcerations in the nose and throat, but with variable results.

Only in the case of superficial tuberculous ulcers can a thorough and permanent cure be expected; with deeper infections no lasting cure is to be obtained. For tuberculous and lupoid ulcers a complete and lasting cure can be obtained if the infection has not penetrated too far into the tissues, but if the infection is deep, as is commonly the case, only a superficial healing, or none at all, is to be expected.

The Treatment of Tropical Ulcers.

It is well known that external ulcers are very numerous and difficult to cure in the tropics. Not only are there those ulcers which commonly occur in temperate climates and which, owing to unfavourable tropical conditions, progress unfavourably, but also there are ulcers which are indigenous. The method should be particularly useful in the treatment of these tropical ulcers.

Reviews.

SURGICAL PATHOLOGY.—By William Boyd, M.D., M.R.C.P. (Edn.), F.R.C.S. Philadelphia and London: W. B. Saunders & Co. Pp. 837, with 349 illustrations and 13 coloured plates. Price, 45s. net.

THIS is a new book on surgical pathology. Many books have been written on the subject but it is a branch of pathology which has not received the best attention from writers and there is certainly room for another good book on the subject. Books on general pathology must of course cover the ground that is covered by this book but writers do not always deal with the subject from the view-point of the surgeon. A sound knowledge of anatomy is important to the surgeon but a sound knowledge of pathology is essential otherwise he "is no better than a heaver of flesh and a drawer of blood."

The chapter on surgical bacteriology is surprisingly short but one soon realises that the writer has confined

himself strictly to the subject as it affects the surgeon; this to a large extent consists of a description of the methods of collecting material. Perhaps a note on the intelligent interpretation of pathological reports might have been included here.

There is a short but very explicit note on blood grouping. A number of chapters on general pathology, on inflammation, healing, gangrene and the more important specific infections, follow. A short but complete review of the research in the causation of cancer that has been carried out during the last few years is given; this naturally does not include the recent work of Dr. W. E. Gye as the book was published before this appeared. The rest of the book is devoted to regional pathology. The book is a complete one. It is a great advance on any book on the subject with which the reviewer is familiar. The literary style is a pleasant one. There are 349 very clear text illustrations and 14 beautifully executed coloured plates.

The type is large and clear and the paper is of good quality.

DISEASES OF THE GUMS AND ORAL MUCOUS MEMBRANE.—By Sir Kenneth Goadby, K.B.E. Second Edition. London: Humphrey Milford. Oxford University Press. Pp. 408. Price, 42s. net.

THE first edition of this book was published in 1923. The fact that a second edition is already demanded is sufficient evidence of the importance of the subject and is a great tribute to the author and the publishers.

The mouth is the ground on which many branches of medical science meet; the physician, the surgeon, the dental surgeon, the pediatrician and the bacteriologist all have an interest therein, so that a book of this nature has a wide range of readers.

In the chapters on "disease originating from mouth infections" and "disease with oral symptoms" the author shows discrimination and restraint. It would have been easy to have distributed the subject-matter of a text-book of medicine between these two chapters. Pyorrhœa alveolaris has at various times been held responsible for most diseases and such diseases as have not been associated with this condition have at least some mouth complications.

The new departures in this edition include a section on the "poisoned heart" in the chapter on diseases originating in mouth affections and a chapter on vaccine therapy in connection with infections of the mouth. The former section is illustrated by a number of electrocardiograms. The chapter on vaccine therapy is written for the student, for the physician or dental surgeon and for the bacteriologist; it includes a general discussion on vaccine therapy, a description of the methods of obtaining bacterial samples for the preparation of the vaccine, a discussion on various kinds of vaccine and the selection of the organism and finally suggestions as to the administration of the vaccine.

The book is illustrated with a number of good text figures and 8 well executed full-sized coloured plates. We can thoroughly recommend the book.

MINOR SURGERY.—By L. R. FIFIELD, F.R.C.S. (Eng.). London: H. K. Lewis & Co., Ltd., 1925. Pp. X plus 491, with 273 illustrations. Price, 12s. 6d. net.

Those who perform minor surgical operations must do them well as patients demand a good result for what they regard, often quite wrongly, as trivial undertakings.

The greater part of minor surgery comes within the province of the general practitioner and it is essential for him to proceed on correct lines as small errors loom large and mean the loss of reputation and practice.

This book covers the whole subject and is written by one who has a large experience in the teaching of students.

The chapters dealing with infection of the hand, fractures and minor surgical operations are very full and useful.

It is altogether an excellent book admirably suited as a ready reference for students and general practitioners.

KOBY'S SLIT-LAMP MICROSCOPY OF THE LIVING EYE.—Translated by C. Goulden, O.B.E., F.R.C.S. and Clara Lomas Harris, M.B. London: J. & A. Churchill, 1925. Pp. 221, with 43 illustrations. Price, 10s. 6d. net.

THIS excellent manual on the use of the slit-lamp is the work of the first assistant at Professor Vogt's clinic at Basle, where the ophthalmologists of all the world have gone for instruction in the use of this highly interesting new instrument, and is a summary of the teaching given there in the last two years, and supplementary to Professor Vogt's "Atlas of the Microscopy of the Living Eye."

It is essentially practical in character, the first three chapters being devoted to the description of the instrument and general methods of using it, and after that come chapters on the conjunctiva, cornea, anterior chamber, iris, lense and vitreous, giving in each case the special technique for examining the structures, and describing the normal and pathological appearances commonly found in them. This is interesting to all ophthalmologists and not merely to those who have access to a slit-lamp, as it will enable them to see more and interpret better what they see when using the ordinary methods of focal illumination; especially if they have studied Harrison Butler's recent papers describing what can be seen when using an ordinary nitrogen 2-watt lamp as the source of illumination.

The illustrations are not numerous but very useful and practical, and the general turn-out of the book is good.

PEDIATRICS.—By various authors. Edited by Isaac A. Abt., M.D. Vol. VI. Philadelphia and London: W. B. Saunders Co. Pp. 736, with 150 illustrations. Price, 45s. net.

THE sixth volume of this great system of pediatrics follows the same lines as the preceding volumes. It deals chiefly with the infectious diseases of childhood, and with anaesthesia in children. Each of the twenty-six contributors is a distinguished American physician or surgeon. The chapters on typhus fever and cholera are by Dr. Victor Heiser. The chapter on incubation and tracheotomy is particularly full and instructive and is very fully illustrated. Coloured plates of the eruptions seen in the exanthemata would have been valuable additions. The volume will be found indispensable to the specialist in children's diseases and will doubtless be acquired by every large medical library.

CHRONIC DISEASE: A WORKING HYPOTHESIS.—By E. Bach, M.B., B.S., D.P.H., and C. E. Wheeler, M.D., B.S., B.Sc. London: H. K. Lewis & Co., Ltd., 1925. Pp. VIII plus 153. Cr. 8vo. Price, 7s. 6d. net.

THE authors set before them the task of pointing out how intestinal toxæmias are associated with a constipating diet and claim that uncooked food, comprising raw fruit, nuts, vegetables salads, dairy produce, wholemeal bread, cereals and milk puddings will change the physical and bacteriological characters of the faeces so that the non-lactose fermenting organisms and the toxic substances which form part of the intestinal contents gradually disappear. The authors hold that the presence of these poisons combined with increased permeability of the bowel wall to toxins produce a cumulative effect and that meat eaters sooner or later begin to suffer from the effects of the intoxication. One line of attack on the poison-producing organisms is by vaccine treatment which the authors claim to have caused striking improvement in many cases. Instead of regarding local infections as being the causes of arthritis and fibrositis, they claim that in many cases the local infections become possible owing to the absorption over long periods of intestinal poisons. The good effects of vaccine treatment are regarded as being proof that there is a specific as

well as a general resistance to chronic infections. Even in a large proportion of cases of cancer the treatment of the authors has diminished pain and apparently prolonged life, but no case of cure is claimed.

The treatment recommended by the authors consists in a diet on the lines already mentioned, combined with vaccines made from faecal organisms cultured on neutral red-bile salt-peptone-lactose agar. Usually there is only one kind of non-lactose fermenting organism, if there are two kinds both are used in preparing the vaccine. Cultures are made on agar slopes kept at 37 degrees centigrade for 16 hours. The growth is mixed with saline and killed at 60 degrees centigrade. The growth of one average sized slope is made up to 25 c.c. and 25 c.c. of a mixture of one part of distilled lysol with three parts of absolute alcohol is added. The doses of the vaccine range from initial doses of 0.04 to 0.9 c.c. the dose being approximately doubled on each occasion unless marked local or general reaction follows, in which case the next dose is not increased. The interval between the doses is usually long the subsequent dose is not given until improvement ceases to take place. An analysis of 500 cases is given from which it appears that excellent results were obtained in the majority of cases of anaemia, chronic rheumatism, neurasthenia, chronic gastritis and chronic colitis. Good results are claimed in a fairly large proportion of cases of rheumatoid arthritis, sciatica, neuritis, epilepsy, chronic headache, etc. Altogether the book is well worthy of study although it cannot be claimed that it offers a complete solution of the problem of chronic intestinal intoxication and its multifarious after-effects.

ARTERIOSCLEROSIS.—By the late Rt. Hon. Sir T. Clifford Allbutt, P.C., K.C.B., M.A., M.D. London: Macmillan & Co., Ltd., 1925. Pp. 108. Price, 5s. net.

THOUGH Sir Clifford had reached an advanced age before his sudden death, this little book shows no sign of senility on the part of its author; throughout its pages there is a freshness of outlook combined with mature experience and it is evident that Sir Clifford continued to be a student till his last days. Many of his views on arteriosclerosis have become part and parcel of our common knowledge and practice, but advances have been made in recent years by other workers and by the author himself so that this volume forms a necessary supplement to his great work on diseases of the arteries which was published in 1915. Not the least valuable feature of the book is its small size, it forms an enlarged edition of a post-graduate lecture, and so the busy practitioner will find it possible to acquire the most recent views of the master in a very short time. The distinction between hyperpiesia and the hyperpiesis which is secondary to renal disease is clearly brought out, and though much remains obscure as to the causation of high blood pressure the practitioner who reads this little book will not fail to obtain clearer and more helpful views on the condition.

The line of treatment which is recommended is confessed to be purely symptomatic, it cannot be otherwise as the essential causes of high blood pressure remain uncertain. None the less the medical man will obtain great help from the chapter on treatment, which includes an account of the valuable aid which may be obtained from diathermy. It is characteristic of the energy and optimism of the author that he contemplated publishing full case reports on a later opportunity which unfortunately was not granted to him.

SYMPTOMS OF VISCERAL DISEASE.—By F. M. Pottenger, A.M., M.D., LL.D., F.A.C.P. Third Edition. St. Louis: The C. V. Mosby Co., 1925. Pp. 394, with 86 text illustrations and 10 colour plates. Price, \$6.50.

We can recommend this book to the clinician who wishes, in the short time at his disposal, to keep

abreast of modern advances in the basal sciences of medicine:—physics, chemistry, anatomy, physiology, etc., in their intimate relationship with clinical diagnosis and treatment.

The work is a compilation, but much originality is shown in the fitting together of theories and the unification of general principles.

In the introduction a plea is made for the study of the patient as an individual and emancipation of the clinical view of the patient from the thralldom of laboratory findings. In his opinion all possible use of the laboratory should be made, but the clinical study of the patient as an individual is the most important in making the diagnosis. Whatever the local bacteriological or pathological findings, the fact should always be kept in mind that the patient, both physically and psychically, is a complete entity, and any pathological process, wherever it may be, acts and reacts throughout the whole. It is the well-trained clinician who is able to detect these departures from the normal, long before the laboratory can show that anything is wrong.

The book proper is divided into three parts. In the first the vegetative nervous system is dealt with in its general, anatomical, physiological, pharmacological and physical aspects. In the second the relationship between the vegetative nervous system and the symptoms of visceral disease is shown. In proceeding to do this the author propounds a more or less new method of classification of the symptoms of disease. A brief quotation will best illustrate the method in which he goes about this:—"Many classifications of symptoms may be offered, depending on the point of view of the author, but a rational classification of the symptoms of visceral disease must take into consideration the colloidal state and ionic content of its body cells, the nervous and endocrine systems through which cellular activity may be influenced, and the psychic state of the patient." In the third part the question is dealt with regionally; the gastro-intestinal tract, the respiratory system, and the circulatory system are dealt with serially; then the salivary glands, the nasal and other mucosa, the larynx, the eyes, the urogenital tract and the subdermal musculature. Lastly we have a chapter on the innervation of the endocrine glands.

The book has some 86 illustrations and 10 coloured plates; it is written in a clear style and may be understood by anyone who takes the trouble to read it carefully. It is full of useful information and there are few who will not find its teaching most stimulating and enlightening.

EFFICIENCY TESTS FOR THE LIVER AND KIDNEYS. (LORD REAY LECTURES, 1923-24.)—Delivered by Sohrab H. Nanavutty, B.Sc., M.B., B.S., B.Hy. Bombay: Published by the Lord Reay Lectureship Endowment Fund, 1924. Pp. 35.

THIS useful little hand-book, dealing with the various tests for determining the liver and kidney functions, was the subject-matter of Lord Reay's lectures delivered by the author in Bombay in 1923-24. The author has dealt with the various efficiency tests for the liver and kidneys in a clear and concise way, both theoretically and practically.

We recommend this small book to both clinicians and laboratory workers who will, we are sure, derive benefit from its perusal.

THEORY AND PRACTICE OF NURSING.—By M. A. Gullan. Second Edition, with three additional chapters. London: H. K. Lewis & Co., Ltd., 1925. Demy 8vo. Pp. XVI plus 234. Price, 9s. net.

THIS is an excellent hand-book by one who knows her subject thoroughly and who also knows how to convey her knowledge to others. It will be especially valuable to those who give courses of instruction to nurses, especially if they use the book in the manner suggested by the author. The intention is that the summaries of instruction should be used as a basis on which the teacher should build her own teaching.

To nurses the book will be equally valuable, it contains in a readable form a precis of what every nurse ought to know. The author apologises for the free use of technical terms and it must be admitted that some of these are likely to remain mere words to the average nurse; on the other hand it is true that nurses like doctors take a professional pride in the use of large words which are incomprehensible to the lay man. We would even venture to commend the book to medical men who too often are unfamiliar with the important little details which can safely be left to the trained hospital nurse, but which have to be carried out by the doctor himself in places where qualified nurses are not available. It should be stated that the author is the Sister Tutor of St. Thomas's Hospital where an exceedingly high standard of nursing is maintained.

OPHTHALMIC NURSING.—By Mary Mason Spring-gay. London: Methuen & Co., Ltd. Pp. 133, with 67 illustrations. Price 5s. net.

This small book, written by the Matron of the Western Ophthalmic Hospital, London, describes the nursing technic taught in that hospital during the last 14 years, and, in addition to nursing details, gives a short description of the simpler diseases of the eye and complications which a nurse is likely to come in touch with, and a very useful account of the sterilisation and care of eye instruments, and the arrangements necessary for the ordinary ophthalmic operation.

The preparation of the patient for operation both as regards cleanliness and from a psychical point of view is well put.

The book is one which will be found very useful for nurses starting duty in ophthalmic wards, but the technic now in use in any of the larger Indian eye hospitals is more complicated and differs in many important details from that described here. The book, however, is well and clearly written and will be found very helpful.

Correspondence.

INDIAN DIETS IN RELATIONSHIP TO HEALTH AND DISEASE.

To the Editor, "THE INDIAN MEDICAL GAZETTE."

SIR,—In Majors Acton and Chopra's paper about the Tridosh theory of Ayurved in the July number of the *Indian Medical Gazette* there appeared the following statement:—"Pittya is anabolic and kaphya is katabolic, and pittya is heating and kaphya cooling." There appears to be some confusion as the following will show:—

The Tridosh theory is the basic principle in every department of Ayurved in health and disease.

Normal (physiological) pittya stimulates cellular activity, produces increased body heat and is katabolic or destructive in health. Similarly normal kaphya does not stimulate cell activity, produces no extra body heat and is anabolic or constructive.

In pathological conditions both abnormal pittya and kaphya dysfunction. There may be either hyper- or hypo-function.

In pittya hyperfunction, as in fever for example, there is further increase of cellular activity than normal, more production of body heat (fever) and increased katabolism or burning of tissues.

In pittya hypofunction, as in asthenic conditions (e.g., convalescence after fever, a stage described in the Unani system as neither health nor disease) there is reduced cell activity, reduced katabolism and reduced production of heat.

In kaphya hypofunction, as in constipation (one of the functions of kaphya is secretion and excretion) there is less anabolism, less cooling effect on the body and diminished secretion.

In kaphya hyperfunction, as in diarrhoea, there is increased secretion, increased katabolism or tissue waste but no increased cellular activity and no increased production of heat.—Yours, etc.,

A. T. ROY, L.M.S.

HAZARIBAGH,
23rd July 1925.

CASES FOR DIAGNOSIS.

To the Editor, "THE INDIAN MEDICAL GAZETTE."

SIR,—In your issue for July two interesting cases are noted in both of which the diagnosis is in doubt. May I make the following suggestions in order to further discussion and obtain help?

The first case, reported by N. Chatterjee, M.B., seems to me very like Henoch's purpura.

This syndrome is reserved for those cases of purpura which are associated with gastric crisis. It is most common in boys about the age mentioned, i.e., 15 years. Vomiting is an early symptom and either diarrhoea or obstruction occur. Many cases have been operated on for intussusception or appendicitis. The temperature is never high, sometimes normal, thereby excluding purpura associated with small-pox or measles. General body pains especially arthritic are usually present.

Fatal results are usually due to cerebral hæmorrhage. The "subdermal hæmorrhages in the legs and abdomen" would fit in with the purpuric eruptions.

Personally I have never seen a fatal case of Henoch's purpura but those I have seen fit in well with the condition described. Transfusion is said to offer the best chance of recovery.

The second case reported by S. D. Narain, L.M.S., is of a man aged 42 with extensive burns, which had all healed except for a small ulcer. As the diagnosis of uræmia presents some difficulties I submit two alternatives.

Could the ulcer have become infected with tetanus and were the convulsions of this character? The classical opisthotonos is by no means always present and unless one is on the lookout for tetanus, it is very easy to miss atypical cases.

The second alternative is Stokes-Adams' disease. Possibly the original loss of consciousness might have been due to this and not to the coal fire. The rest in bed for several months might have diminished the symptoms temporarily while the absorption of toxins from the burns would be deleterious to the heart muscle.

When the impulse failed to penetrate the bundle of His and the ventricles stopped, the patient became unconscious; when the ventricles resumed and the pulse returned, convulsions occurred. Nausea and vomiting would fit in with the picture. Palpitation would be stimulated by the rapid contractions of the auricles contrasted with the slowly beating ventricles. Pulsation in the neck is also prominent.

With regard to treatment, caffeine and strychnine act well but digitalis is contraindicated as it reduces the conductivity of the bundle. A Wassermann reaction should be tried in every case.—Yours, etc.,

I. NEIL LEITCH, M.B., B.S. (Lond.),
M.R.C.S., L.R.C.P.

MORAN P. O.,
ASSAM,
23rd July 1925.

MEDICAL RELIEF AND MEDICAL EDUCATION PROBLEMS IN BENGAL.

To the Editor, "THE INDIAN MEDICAL GAZETTE."

SIR,—The following is a copy of letter No. 260 dated the 25th July 1925 from the All-India Medical Licentiates' Association, Bengal, to the Surgeon-General with the Government of Bengal.

"I am under instruction of my Committee to request the favour of your kindly placing before the Government of Bengal the views of my Committee on the

burning question of medical relief and medical education in Bengal, which is evidently agitating the public minds at present, and all forces are mobilised and no stone is left unturned to carry the scheme into practical operation.

The Association and my Committee, I beg to submit, have already chronicled its opinion on this important subject in all its bearings, and communicated to you their considered decision in due course. They have opposed tooth and nail any measure, which, instead of doing any tangible good to the country and its people, would inflict a severe blow at the root of higher education in our medical schools, lower its standard and manufacture a lowly type of medical practitioner, who will work havoc when he is let loose with a cheap and inferior diploma in the midst of a poor, illiterate, suffering mass in the guise of a "legalised quack" which the benevolent Medical Act and the Medical Degrees Act intended to suppress.

My Committee desires me to go back to the history of two of the most useful classes of practitioners in India, which arose from humble types known not so long ago as "black doctors" and as "apothecaries." During the existence of this progressive class of licensed medical practitioners for three-fourths of a century the tendency has ever been upwards, and to the intense regret and surprise of my Committee a contrary tide has set in, and it is now vehemently urged to found a "network" of medical workshops and to create a lowly type of practitioner, for rural areas, where, in the opinion of my Committee, only a capable and efficient general practitioner, possessing a thorough knowledge in all branches of the science to deal with all classes of medical and surgical cases is called for, when it is obviously true that like the cities and towns the poor villagers are exposed to all sorts of maladies, and the great majority of the rural population have neither money nor mind nor any opportunity to avail themselves of highly qualified specialists and medical practitioners not living in their neighbourhood.

My Committee further begs to point out the new circumstance created in the country by the recent events, viz., (1) refusal of recognition of the M. B. degree of the Calcutta University by the General Council of Medical Registration and Education of the United Kingdom, (2) opening of Ayurvedic Colleges and schools, under the patronage of various Local Self-Governing Bodies and (3) the prevailing tendency of the "Intelligentsia" to resuscitate the indigenous systems of treatment, viz., (a) Ayurveda and (b) Yunani.

Over and above, my Committee has not failed to keep an eye over the number and quality of the students flocking to the gates of the medical schools in thousands to take up a career in medicine—considerably out of proportion to the vacancies in each school. Besides, at least, it is not within the knowledge and experience of my Committee that there has ever been a single prayer from the students, their parents and guardians, or the products of these institutions to lower the standard of medical education in our schools or deny the country the benefit of higher medical education and better medical aid.

My Committee fully recognises the need for increased medical aid for rural populations, for which a few medical schools and colleges should be founded, but my Committee is not inclined to sacrifice quality for quantity, particularly in the domain of "healing art" which deals with life, or prescribe a distinctly inferior type of "recipe" for the poor and unfortunate dumb population. This differential treatment between suffering man and man is galling to the taste of my Committee, and it is a wonder of all wonders how such a retrograde measure obtains support at the hands of my leading and educated countrymen whose hearts profusely bleed for the well-being of the poverty-stricken ignorant masses.

Although my Committee, I beg leave to add, never contemplates the idea of depreciating the value of curative lines of treatment, it would concentrate the energy

of the whole country for preventive measures, and preservation of natural immunity which is at bay owing to the acute economic distress prevailing in the country. The amount which is being collected for opening ill-equipped, poorly staffed and rickety hospitals, dispensaries and schools may better be employed for ridding the villages of their insanitary conditions and providing adequate and wholesome food, water and cloth to the famished people, who are unable to stand the numerous preventable diseases to which they prematurely succumb.

It goes without saying that the Association has recommended the extension of the period of study for our medical schools from four to five years, the abolition of at least the lowest grade of medical practitioners, i.e., the licentiates, and advocated the cheapening of "medicament" by manufacturing cheap medicinal preparations, accessories and appliances, which will prove conducive to the welfare of the distressed because my Committee agrees with the valuable Flexner report (United States) "that no physician poorly equipped or well-equipped will go anywhere where a livelihood cannot be gained" and as by cheapening the lawyers the litigations have not been reduced to the minimum but, on the contrary, the morale and capacity of the people have dwindled, by cheapening the doctor only without cheapening the paraphernalia and altering the economic conditions the salvation will not be forthcoming.

Taking all these points into consideration, my Committee begs to suggest that a strong Committee consisting of officials and non-officials of leading positions and enjoying public confidence, in which our Association should be represented, be immediately appointed for an open and exhaustive enquiry into the whole question, which affects millions of people in rural tracts, and my Committee fervently hopes that in the meantime there should be a cry of "halt" and all proposals to start fresh medical schools be postponed *sine die*.—Yours, etc.,

SATKARI GANGULI,

Provincial Secretary to the All-India
Medical Licentiates' Association, Bengal.

30/12, DOCTOR LANE,
CALCUTTA,
29th August 1925.

THE BRITISH SOCIAL HYGIENE COUNCIL.

To the Editor, "THE INDIAN MEDICAL GAZETTE."

SIR,—We desire to draw attention to the first Annual Meeting of the British Social Hygiene Council which is being held to-morrow, and to the national importance of the subject with which this Council is concerned.

The Council under its new name replaces, after 11 years of valuable work, the National Council for Combating Venereal Diseases, and points at the same time to an important extension of its work, which will take place without the slightest relaxation of the past work of the Council under its old name in respect of public enlightenment on the problems of and advocacy of the provision by public authorities of adequate facilities for the free treatment of venereal disease for those who need it.

During these eleven years it has been a main part of the work of the National Council to promote the policy and the work of the Ministry of Health and of Public Health Authorities in securing diagnosis and treatment for all, as a means for diminishing infection and avoiding the terrible consequences associated with these diseases; and the Council have reason for the confident view that a wide distribution of information concerning these diseases, which they have been able to furnish, has been an important factor in the medical success which has been achieved.

The extent of the success of the combined efforts that have been made is indicated in part by the fact that during the last four years the number of new patients with syphilis in this country presenting themselves at the treatment centres has declined by nearly 50 per cent.

Great progress has been made since the formation of the purely voluntary organisation of the National Council for Combating Venereal Diseases in 1914. To-day the organisation of the British Social Hygiene Council spreads to all corners of the Empire. It is recognised by and co-operates with Government Departments—the Ministry of Health, the Colonial Office, the Admiralty and the Air Ministry—in providing material for popular enlightenment and in co-operating in all measures calculated to reduce the ravages of venereal disease, receiving grants for certain specified activities. At home active co-operation exists between almost all the Local Authorities in the country and the Council; and out of the 154 areas the Council has recognised Branches in 85, creating centres for the formation of public opinion and for building up protective and preventive machinery in the interests of youth. Sister Councils have been established in Canada, South Africa, Australia, and in six of the Crown Colonies, and a close liaison exists between the Council and Colonial Health Departments throughout the Empire. Although social conditions may vary widely among the different races the medical principles underlying the elimination of venereal diseases remain the same, and the methods which have been adopted at home are proving such an outstanding success that their adaptation to other parts of the Empire is to be warmly advocated.

The British Social Hygiene Council is now extending its attack on venereal disease on social as well as medical lines and is working for the reduction of promiscuity. To ensure the success of this policy increased prominence is being given to "the elimination of those conditions of life which tend to foster promiscuous intercourse and the spread of disease"—the third recommendation in the Report of the Committee of Inquiry on Venereal Diseases.

In this connection attention may be drawn to the fact that the National Council for Combating Venereal Diseases and the Society for the Prevention of Venereal Disease have accepted the Report of the Treveltham Committee: and as there is now one President (Sir Auckland Geddes) of both these organisations, who is also chairman of the permanently established Liaison Committee between them, the possibility of controversy between them has, it is hoped, been eliminated.

With the direct object of preventing the risk of infection the British Social Hygiene Council is extending its work to include the fostering of character-training of the young. It advocates basing habit formation on a knowledge of the facts of life and on the attainment of right conduct through consciousness of social and racial responsibility. The Council is also working for the eradication of all known forms of commercialised vice and the promotion of adequate facilities for recreation and diversion.

In the Council's teaching the fundamental importance of maintaining the integrity of family life will be an essential object of the British Social Hygiene Council.

During the last eleven years the public has supported the National Council for Combating Venereal Diseases, though its work in the main has been so specialised that apathy might have been excused. On the basis of the success already obtained a fresh appeal is now being made which must commend itself to all those who have the well-being of the family and of the nation at heart, whether as regards the elimination of Venereal Diseases or from the standpoint of a general improvement in the conditions of national life.

On both these grounds we appeal to the general public for support in achieving our objectives.—Yours, etc.,

A. C. GEDDES, K.C.B., M.D. (President).
JOHN BLAND-SUTTON, Bart., F.R.C.S., (President, Royal College of Surgeons of England).

ANTHONY BOWLBY, K.C.B., F.R.C.S., (Past President, Royal College of Surgeons of England).

FRANCIS H. CHAMPNEYS, Bart., M.D., F.R.C.P., J.P., (Vice-President), (Chairman, Central Midwives Board).

WINIFRED CULLIS, O.B.E., D.Sc., (School of Medicine for Women).

PHILIP COLFOX, M.P.

GORELL, C.B.E., M.C., (Past President, N. C. C. V. D.)

W. GREAVES-LORD, K.C., M.P.

SOMERVILLE HASTINGS, M.B., M.S.

HENRY R. KENWOOD, C.M.G., M.B., D.P.H., (Chadwick Professor of Hygiene, London).

J. SCOTT LIDGETT, D.D., (Late President, Free Church Council).

JAMES A. LINDSAY, M.D., F.R.C.P.

A. LOUISE McILROY, D.Sc., M.D.

F. N. KAY MENZIES, M.D., F.R.C.P. (Ed.).

WILLIAM MILLIGAN, M.D., M.S.

BERKELEY MOYNIHAN, K.C.M.G., C.B., F.R.C.S.

ARTHER NEWSHOLME, K.C.B., M.D., (Vice-President).

R. W. PHILIP, M.D., F.R.C.P., (Past President, Royal College of Physicians, Ed.).

ALFRED SALTER, M.D., M.P.

MARY SCHARLIEB, C.B.E., M.D., M.S., (Vice-President).

CONSTANCE SHAFTESBURY, (Vice-President).

SYDENHAM, G.C.M.G., F.R.S., (Past President, N. C. C. V. D.).

TREVETHIN (Past President, N. C. C. V. D.).

E. B. TURNER, F.R.C.S., (Vice-President).

WILLINGDON, G.C.S.I., G.C.I.E., G.B.E.

CARTERET HOUSE,

CARTERET STREET,

WESTMINSTER, S.W.1.

8th July 1925.

ACUTE PURULENT OPHTHALMIA.

To the Editor, "THE INDIAN MEDICAL GAZETTE."

SIR,—During the last fortnight I have seen at least a dozen cases of ophthalmia which proved rapidly fatal to the sight.

Cause.—Impossible to guess without a microscopic examination, which, unfortunately, I could not get done. In one family two children and their mother had the disease. In another the mother and the daughter were the sufferers. In other cases no trace of the spread of infection could be found. Mostly children have been affected; one child lost both eyes on account of panophthalmia. Another woman had such a large central ulcer of the cornea that while she was washing the eye the lens came out by itself, followed of course by panophthalmia. Both eyes were affected in a baby boy, resulting in a large prolapse of the iris in one eye and corneal opacity in the other. The same condition was seen in another girl of about 7 years of age. The infection does not seem to be gonorrhoeal because there was no history of gonorrhoea in any of the families. It was not diphtheritic, because there were no signs of diphtheria in any of the cases. The same may be said about pneumococcal and tubercular infections. It does not seem to be contagious as none of the patients living in the same ward were infected.

Symptoms.—The eye becomes red and swollen, the swelling increases very rapidly and within a few hours it is very difficult to open the eye on account of the swelling. There is an abundant discharge of thick pus; the discharge from under the lids is more serous and the fluid of a yellowish colour. The cornea becomes ulcerated very soon resulting in prolapse or panophthalmia; the pain is very severe and intense. One eye is attacked first but the infection extends to the other eye very shortly.

Course.—The inflammation takes a long time to subside. The discharge is the last thing to decrease. Hot fomentations; blisters, use of caustics, atropine, etc.,

relieve the pain but little and do not save the cornea from sloughing and ulceration.

Treatment.—Silver 2 per cent. was used for a pretty long time to check the discharge and yet it was not quite satisfactory. Mercury cyanide 1 in 50 had no effect in prevention or in lessening the intensity of the inflammation, pain and discharge. The use of atropine and iodoform helped the patients in relieving the pain due to the corneal ulceration and that was all.

N.B.—All these cases were sporadic and belonged to different villages, except in the case of two families in which two children and their mother and a mother and daughter were the sufferers. In all instances the children were the first to suffer. It is rather an uncommon occurrence to see so many cases of the same nature and suffering with the same result in so few days. I have never seen such cases before and I wonder if such cases have been seen and attended to by others. I shall feel grateful if other practitioners would write on the subject giving the treatment they found most useful.—Yours, etc.,

E. CHARLES.

EYE HOSPITAL,
GUJRANWALA,
21st September 1925.

PERACRINA VERSUS MALARIA.

To the Editor, "THE INDIAN MEDICAL GAZETTE."

SIR,—An article in the May number of the *Indian Medical Gazette* deals with the publication in the *Archiv für Schiffs-und Tropen-Hygiene* on "Peracrina," a new remedy against malaria. The author does not seem to be convinced of the good results of the treatment with Peracrina as recorded in the publication and he believes that some of the curves reproduced might well be employed to shew the natural course of untreated malaria.

It may be that in the short publication referring to the work against malaria of the Swiss Red-Cross Expedition in the famine districts of South Russia, the incidental circumstances connected with the various cases have not been so fully described as to permit a conclusive evaluation of the actual results to readers who had no opportunity of studying the prevailing conditions.

Whoever saw the dreadful general circumstances of the Russian famine would hardly have found any support for the idea that in the cases in question cures could have been obtained without any treatment. It must, on the contrary, be regarded as a fact that a practically complete cure, i.e., a condition of the patient where he was free from fever and complaints and absolutely fit for work, has been obtained through Peracrina in a very high percentage of cases even when other remedies failed. It then often appeared—contrary to what is observed with other methods of treatment—that the state of health and clinical symptoms of the patient (absence of fever, normal spleen, etc.) were those of a normal physical condition while there were still some plasmodia in the blood. In the case of other treatments the plasmodia disappear first from the peripheral blood but often continue to develop in spleen and liver and cause the persons affected to appear still suffering and unfit for work.

The treatment of malaria with Peracrina in Russia was, by the way, only a first attempt carried out under extraordinarily difficult conditions. A second Swiss expedition was despatched in 1924 to the Greek malaria districts, and the results obtained there will be published shortly. They will prove that Peracrina must in fact be recognised as a successful remedy against malaria.—Yours, etc.,

J. WALKER.

BERN,
13th August 1925.

(Note.—There is a paper on the use of Peracrina 303 in malaria in this number of the *Gazette*.—Editor, I. M. G.)

A CASE OF FOOD SENSITIVENESS.

To the Editor, "THE INDIAN MEDICAL GAZETTE."

SIR.—In the issue of your *Gazette* for May 1923. Dr. Birendra Mohan Chowdhury reported a case of food sensitiveness, asking for suggestions as to its true etiology and treatment. I venture to put forth my views of the case in the following few paragraphs:—

I consider the case to be one of *urticaria*. The picture delineated by Dr. Chowdhury is of course striking in its manifestations. The symptom-complex is no doubt caused by an acute and transient inflammation, in which mucous membranes of the stomach, eyes, and upper respiratory passages are attacked in conjunction with the skin. The skin lesion described is exactly urticarial,—raised, firm, white, "just like the swelling produced by the bite of red ants." The symptoms of chill, itching, nausea, cough, and running from the nose and eyes, may all occur in an acute attack of urticaria, for urticaria may affect mucous membranes, particularly gastric and bronchial, sometimes leading even to asthmatic symptoms.

As regards the order of appearance of the eruption, the first two sites noted are both within easy reach of the fingers of the right hand, and the wheals are easily evoked by scratching. In reply to the point that the boy's father had similar symptoms in his childhood, it may be argued that without launching into the mystery of a weird symptom-group inherited from father to son, we may plainly say that urticaria is such a common ailment, it is no wonder that the father suffered from it in his childhood. The child evidently gets well with the completion of stomachic digestion, and during this period, what with fullness of the stomach, what with a generalised peripheral dilatation of capillaries and consequent decrease of blood supply to the brain, or what with the particular nature of the toxin elaborated, he easily falls asleep.

The real difficulty is in the detection of the offending agency. Whatever we may call it, idiosyncrasy, anaphylaxis, or supersensitiveness, the poison which produces it cannot be so easily dismissed from the dietary. The attacks have always occurred at the end of meals. In the detection of the offending article, great patience and the cultivation of the detective faculty is wanted. The cause may be discovered by keeping records of the diets on the dates of the attacks and comparing notes. There are indeed many common articles of diet which may produce the eruption in particular individuals. It is difficult to persuade even medical men that such common articles of diet as eggs, milk, and even rice, can possibly act in this way. Careful study, however, will often convince unbelievers. The state of the gastric and intestinal functions should be investigated and set right to prevent the possibility of auto-intoxication, the presence of worms should be thought of, and enquiry into the functions of other important organs should be made to detect any defect.

Treatment should be:—Keeping the bowels open, intestinal antiseptics, removal of intestinal parasites, administration of gastric sedatives, and careful dieting. The following medicines have been found to be useful:—ichthyol in capsules or glycerin, calcium, and magnesia.—Yours, etc.,

R. K. BHATTACHARYYA M.B.

NABADWIP, NADIA,
The 17th July 1925.

"DIAGNOSIS" IN HOSPITALS.

To the Editor, "THE INDIAN MEDICAL GAZETTE."

SIR,—I find that I omitted a sentence in the original typescript of the paper "Diagnosis in Hospitals" forwarded to you which you very kindly published and so with the object of bringing the omission to the notice of those interested in this paper I shall be much obliged if you will kindly insert this letter in the columns of your valuable *Gazette*.

Nov., 1925.]

After the words "New, disease having supervened" at the end of the top paragraph in the left column on page 413 of the *Indian Medical Gazette* of September 1925 please read "and grant her a register number in the 'transfer' group and thus prevent her disease (c) or (d) from being enumerated twice."

Thanking you in anticipation.—Yours, etc.,

C. C. MURISON, I.M.S.,
Civil Surgeon, Belgium.

BELGAUM,
30th September 1925.

Service Notes.

APPOINTMENTS AND TRANSFERS.

Lieutenant-Colonel H. Halliday, M.B., I.M.S., is appointed temporarily to officiate as Civil Surgeon, Simla West, up to the 31st December 1925, vice Lieutenant-Colonel Jeudwine, granted leave.

The services of Lieutenant-Colonel R. McCarrison, C.I.E., I.M.S., an Agency Surgeon, on return from leave, are placed temporarily at the disposal of the Government of India in the Department of Education, Health, and Lands, with effect from the 2nd August 1925.

Lieutenant-Colonel R. McCarrison, C.I.E., M.D., I.M.S., is appointed temporarily to the Medical Research Department, with effect from the 2nd August 1925.

The services of the following officers are placed temporarily at the disposal of the Government of Bengal, with effect from the dates on which they assumed charge of their duties.

Captain B. H. Singh, M.C., I.M.S.

" P. C. Banerjee, I.M.S.

" H. E. Murray, M.B., I.M.S.

The services of Captain S. C. Contractor, I.M.S., are placed temporarily at the disposal of the Government of Madras for employment in the Madras Jail Department with effect from the date on which he assumes charge of his duties.

LEAVE.

Lieutenant-Colonel W. W. Jeudwine, C.M.C., M.D., I.M.S., Civil Surgeon, Simla West, is granted leave on average pay for eight months combined with leave on half average pay for four months, with effect from the 1st September 1925.

PROMOTIONS.

Lieutenant-Colonels to be Colonels.

Alexander Fenton, M.B., I.M.S., vice Colonel Peter Dee, M.B., I.M.S., with effect from the 9th June 1925. Colonel Fenton's tenure will reckon from this date.

K. V. Kukday, with effect from 28th March 1925, vice Colonel J. A. Black, M.B., deceased. Colonel Kukday's tenure of appointment will reckon from the 1st July 1925.

Majors to be Lieutenant-Colonels.

B. E. M. Newland, L. A. H. Laek, N. S. Sodhi, M.C., and W. C. Gray, M.B. —Dated the 1st September 1925.

Captain N. M. Mehta, I.M.S., to be Acting Major whilst holding an appointment with the Egyptian Expeditionary Force, from 22nd November 1918 to 23rd December 1919.

RETIREMENTS.

The King has approved the retirement from the service of Lieutenant-Colonel J. M. Woolley, I.M.S., with effect from the 26th July 1925.

The King has approved the retirement of the following Indian Medical Service officers with effect from the dates specified:—

1. Lieutenant-Colonel L. Hirsch, C.I.E., F.R.C.S.E., on account of ill-health, 26th November 1924.

2. Lieutenant-Colonel J. C. G. Kunhardt, 1st June 1925.

3. Lieutenant-Colonel H. A. F. Knapton, 29th July 1925.

RESIGNATIONS.

The undermentioned officers are permitted, subject to His Majesty's approval, to resign their temporary commissions with effect from the dates specified:—

Captain Bankim Behari Das. Dated the 8th August 1925.

Captain Ram Chand Mahajan. Dated the 10th August 1925.

THE UNVEILING CEREMONY OF THE PORTRAIT OF SIR TEMULJI B. NARIMAN, KT. M.R.C.P., L.M., AT THE GRANT MEDICAL COLLEGE, BOMBAY.

On Monday, the 16th March, 1925, His Excellency Sir Leslie Wilson, K.C., G.C.I.E., C.M.G., D.S.O., Governor of Bombay, visited the Grant Medical College, Bombay, at 8-30 a.m. to unveil the portrait of Sir Temulji B. Nariman, Kt., M.R.C.P., L.M. He spent over an hour at the College amidst prominent members of the medical profession and students.

The following is a resumé of Captain Bhatia's address, as Dean of the College:—

Your Excellency, ladies and gentlemen,

On behalf of the members of the Grant Medical College, including all the teaching staff and the students, I have the honour to offer Your Excellency a very hearty welcome in our midst here this morning.

Your Excellency has expressed the keenest interest in medical education and in medical relief in this Presidency. In fact, the medical profession in Western India is very fortunate in having at the head of the administration at this moment one who is anxious to do all that is possible to advance its interests. Your Excellency's interest in medical matters is already bearing fruit. We in this College already look upon Your Excellency as a friend, and we therefore doubly welcome Your Excellency on that account.

I shall now briefly narrate the activities of the College during the last year.

Students.—At the beginning of the year the highest number of students on the rolls was 946. Of these 151 left the College on completion of their four years' course of study and 27 junior students also left the College owing to their failure in the University Pre-Final Examination. 121 new students were admitted into the College during the year. The total number at present on the rolls, therefore, is 768 as compared with 946 in 1923-24, 1,142 in 1922-23, 1,161 in 1921-22, 1,155 in 1920-21 and 1,000 in 1919-20. It is anticipated that the number will gradually diminish. **University Examination.**—(i) **Intermediate Examination for the degree of M.B., B.S.** 250 candidates passed; 20 were placed in the first class. Of the successful candidates 23 were lady students.

(ii) **Final Examination for the degree of M.B., B.S.** In Part I, 212 candidates passed. Of the successful candidates 11 were lady students. In Part II, 202 passed. Of the successful candidates 9 were lady students.

(iii) **Examination for the degree of M.D.**

Branch I.—(Medicine). Two candidates passed, one with distinction.

Branch II.—(Midwifery). One candidate passed.

(iv) **Examination for the degree of M.S.** One candidate passed.

(v) **Examination for the degree of B.Hy.**

Part I.—Six candidates passed.

Part II.—Five candidates passed.

Countess of Dufferin's Fund Scholarship.—The number of lady students receiving the scholarships of Rs. 20 p.m. each from this Fund is 2.

Other Government Scholarships.—5 scholarships of Rs. 40 p.m. each to students of backward communities. 2 scholarships of Rs. 40 p.m. each to Mahomedan communities.

13 scholarships of Rs. 40 p.m. each to lady students. **University Training Corps (I. T. F.).**—There are two platoons in this College. In each platoon there are

1 commissioned officer, 5 non-commissioned officers, and 33 privates.

General Remarks.—Your Excellency, the history of the College since its inauguration is one of steady and consistent progress, but during the last two or three years certain important changes have taken place which promise to increase the efficiency and usefulness of this institution to a still greater extent. These changes are as follows:—

(1) The introduction of a new curriculum for the M.B., B.S. degrees in order to meet the requirements of the British Medical Council. The two important effects of this change are:—

(a) That the students now do three years' hospital work instead of two.

(b) That the standard of preliminary education required for admission to the College is raised from the previous to the Intermediate Science Examination. In both respects the change is very wholesome.

(2) Side by side with the change in curriculum, the number of admissions in the College has been restricted to 120 per year. The admissions now take place only once a year instead of twice as was the case before.

(3) The third important development consists in the increased facilities for clinical instruction offered by the conversion of the Gokuldas Tejpal Hospital into a teaching institution. Our students attend the medical and surgical wards of the hospital, and this is a great help in view of the large number of students who seek instruction in this College.

(4) There has been an increase in the facilities for practical instruction in midwifery and gynaecology also.

(5) In the teaching staff, the most vivid change is the great increase in the number of men who work in an honorary capacity. At present we have the following number on the honorary staff of the College and Hospital:—

Medical.

| | |
|---------------------------------------|---|
| Out-patient physicians | 3 |
| In-patient physicians | 2 |
| Associate Professor of Medicine | 1 |

Surgical.

| | |
|--------------------------------------|---|
| Out-patient surgeons | 3 |
| In-patient surgeons | 2 |
| Associate Professor of Surgery | 1 |

Midwifery and Gynaecology.

| | |
|--|---|
| Associate Professor of Midwifery and Gynaecology | 1 |
|--|---|

Your Excellency, the chief reproach of this College has been that it was too crowded, that we had more students than could be properly trained. That reproach was to a great extent justified. But now, with a reduction in the number of admissions, raising of the standard of preliminary education, increase in the number of years to be devoted to clinical instruction, increased facilities for medical, surgical and maternity work, and a larger number of well qualified teachers, I am extremely optimistic about the future and am confident that the reproach will soon completely disappear. In the Intermediate classes we are already beginning to feel the beneficial effect of these measures. The classes are smaller, the tuition is improved, and we are able to get through more work than before. This College by virtue of its history and noble traditions, also by the high standard of teaching attained, has rightly been regarded as the premier medical college in India. Its Physiological Laboratory is the best equipped in India; in fact some of the distinguished foreign visitors give testimony to the fact that it is second to none in the world. Its Anatomy Department is again one of the best in this country. In the Anatomy School a department of embryology is springing up, which is still in an early embryonic state, but gives promise of developing into a vigorous manhood before long.

I would be failing in my duty if I did not state briefly our most urgent needs in the immediate future which make for increased efficiency and usefulness. These are:—

(a) Suitable hostel accommodation for the students, the present hostel having been recognised by all to be unworthy of this great College.

(b) The need for a new and better equipped bacteriological laboratory.

(c) Increased number of beds in the Jamsetjee Jeejeebhoy Hospital, which are urgently needed for purposes of clinical instruction apart from the question of medical relief.

(d) A clinical laboratory in the hospital under the direction of a clinical pathologist.

(e) A nucleus of a centre for teaching dentistry and a dental hospital.

All these requirements are urgent. They are already under the consideration of the Government, and I have no doubt that they shall have Your Excellency's full sympathy and come to fruition in due course.

I now request Your Excellency to unveil the portrait of Sir Temulji B. Nariman. It is a humble token of the regard we, in the Grant Medical College, have for him. His associations with the College have been lifelong. We shall consider it a matter of great pride to have his portrait in the College gallery, where we have collected the portraits of some of those able and devoted men who have left their mark in the history of the College and have helped to make it what it is.

Abstract from the "Times of India," dated 17th March, 1925.

His Excellency, who made a short speech, said:—

"I thank you all most sincerely for the way in which you have received me on my first visit to your College. It is always a great pleasure to me to meet college students of the Bombay Presidency, for, in making their personal acquaintance, as I try to do on every possible occasion, I get to learn the views of the younger generation on many important topics. I was very glad to hear, in the address which has just been read, the appreciation expressed of the work performed by Major Higham, the last Dean of the College. From all that I have heard about the affairs of the Medical College since I came to Bombay, I have gathered that all you have said about Major Higham's work is thoroughly well deserved, and that his services to the College during his term of office were most valuable.

There has been, as your annual report shows, a small reduction in the number of students attending the various classes. Before I left England, I had an interview with the principal medical authorities there, who informed me that they viewed with considerable anxiety the inadequacy of the training of medical students in Bombay, particularly as regards practical work in midwifery. It is a fact that, about then Government were faced with the position that it was impossible to provide adequate training, especially in midwifery, for the very large number of students who sought to obtain it. On account of the financial position, and for other reasons, it was not possible immediately to extend the facilities for practical instruction in that direction, and the only alternative was to reduce the number of students by raising the standard of admission to the College. The policy which we have adopted has, I am glad to understand, met with the approval of the medical authorities.

Hospital Facilities.

I will not deal at length with the hospital reform scheme, details of which have been published in the press, and which has been accepted by the Municipal Corporation of Bombay and by the Legislative Council, for a wide extension of hospital facilities in Bombay, and I hope that when that scheme goes through there will be ample provision for all kinds of practical medical instruction in connection with the hospitals. I realised the urgent necessity for action to be taken in this matter as soon as I arrived in Bombay, and, while there has been delay, that delay has been unavoidable. I am glad to think, now, that it will be possible in a short time to go ahead, and already several useful propositions have been put before me—propositions not only useful, but which include some very generous proposals; and I

NOTICES.

Nov., 1925.]

have every confidence that we shall be able, during the next year or so, to lay the foundation stone of a scheme which will provide hospital accommodation and facilities for medical training worthy of this great city. I should like to say for myself, as well as on behalf of Government, how very grateful we are to the Municipal Corporation for all the help they have given us by enabling the students to receive instruction in midwifery in the municipal maternity homes. The assistance which they have given us at a difficult time has proved to be of the greatest value, and I am sure that all who have the welfare of the medical profession at heart will appreciate the generous manner in which the Corporation has co-operated with Government in this very important direction.

The Money Question.

Like most institutions in this Presidency, you have one or two wants which I should be glad to see immediately satisfied. At the same time that is a question of money, and I am afraid that Government, has not, at present, at its disposal sufficient funds to enable it to undertake any new construction on a large scale during the coming year. I am fully in agreement with all the proposals which Captain Bhatia has mentioned to improve the efficiency and usefulness of the College. I have been told before of the urgent necessity for more suitable hostel accommodation, of the need of both a bacteriological and clinical laboratory, and I find it really difficult to understand how, in this city, there has not been established, long before now, a centre for teaching dentistry—a branch of medical science which is recognised everywhere, in these days, as one of the most important. It is, of course, quite impossible for me to say when these very necessary needs will be met, but I can assure you that I shall do everything that lies in my power to assist them, as I realise they are important, not only to you students but to the whole future of the medical history of the Presidency.

It has been, as I have said, a great pleasure to me to come here to-day and to meet you. Although I have not been here before, I have heard a good deal about you, and I know well that you, like other medical students in every other part of the world, have a reputation for keenness and thoroughness in every form of sport, combined with those high spirits for which practically every medical student is noted. It was only yesterday that I was reading an account, and looking at pictures, of one of your students, Mr. Nanjiani, who apparently possesses powers of strength and endurance of a most extraordinary character, and I hope that some day I shall have an opportunity of seeing some of his feats—although I can assure you that I have no desire to meet him personally except in an entirely friendly capacity.

Before I perform the duty of unveiling the portrait, I should just like to add that I wish every student here all success in life. I trust that each one will be as fortunate as he himself hopes to be in his examinations, and, when he goes out from this College as a member of the most noble profession there is in the world, he will rise to a high position in that profession, and prove himself worthy of the College which started him on his professional career.

A Distinguished Career.

I come now to what is, for me, a very pleasant duty, namely, the unveiling of the portrait of Sir Temulji Nariman. This College and Sir Temulji may be described as practically contemporaries, but the College has slightly the better of Sir Temulji, as it was started in 1845, and he did not see the light of day until three years later, at Navasari. I do not know whether he took much interest in this College for the first few years of his life, but I learn that he joined this College in his nineteenth year, that he passed out five years later, and that from the day he entered it till now he has never ceased to support the Grant Medical College with his advice and assistance and to a very considerable

extent with money also. From the early days of his professional career he interested himself in midwifery and in 1884 he founded the Parsi Lying-in Hospital, which was the only hospital of its kind in India at the time, and which will remain a lasting monument to Sir Temulji's zeal and devotion to the cause of maternity work which he has always had at heart during his long and distinguished professional career.

From one of the many donations which he has placed at the disposal of this College, I infer that Sir Temulji and I are in complete agreement in regard to the necessity of College students engaging in play as well as in work, for I find that, as a Trustee of N. J. Wadia Charities, he gave Rs. 20,000 for a pavilion for the Grant Medical College Gymkhana at Kennedy Sea face, and indeed, this pavilion owes its existence very largely to Sir Temulji's exertions. I am very glad to find that one who is looked up to as a leader of medical education in Bombay should have adopted in this very practical manner, the policy which I am always prepared to advocate in connection with the colleges of the Bombay Presidency.

Sir Temulji has held many public and professional positions in which he has exhibited great ability and tact. He has been associated for many years with the Bombay Medical Council, the College of Physicians and Surgeons, the Bombay Presidency Nursing Association, the Bombay Municipal Corporation, the Bombay Legislative Council, and with numerous charitable, educational and religious institutions. He has played a leading part in the organisation and development of medical education and of the medical profession during the last 50 years, and in 1914 he received a fitting reward in the Knighthood conferred upon him in that year by His Majesty the King.

We are very glad to see Sir Temulji here with us to-day looking still as hale and hearty as ever. Personally, I have been glad to count Sir Temulji as one of my friends on whose fairness and right judgment I could safely rely. He is one of the greatest sons of the Grant Medical College in Bombay; all those connected with the College must be proud of him, and you will all join with me in hoping that he may still enjoy many years of happiness and usefulness to this College and city. I have much pleasure now in unveiling the portrait of Sir Temulji Nariman."

Sir Temulji in reply considered himself rightly honoured on the unique occasion when his portrait was unveiled not only in his life-time but in his presence. Sir Temulji then re-capitulated several pleasant and memorable incidents and remarked that he had passed his run of jubilees. His own jubilee was celebrated 27 years ago, and his wedding jubilee long since. Two years ago the College celebrated his jubilee in connection with the medical profession. He considered this a great event in his life and sincerely thanked His Excellency for his good wishes.

Colonel Novis proposed a hearty vote of thanks which was seconded by Dr. Dalal.

NOTICES.

"HEALTH ORGANISATION IN JAPAN."

THE Health Organisation of the League of Nations has just issued a volume entitled "Health Organisation in Japan."

The volume contains thirty-six conferences given in Japan on the occasion of the interchange study tour organisation for medical officers of health from the Far Eastern countries by the Health Organisation of the League of Nations (October to December 1925).

This publication exists in the English language only and has been printed in a very limited quantity. A copy may be ordered through any of the League agents in the various countries or direct from the Sales Department of the League of Nations, Geneva, Switzerland. The price is 5/-; \$1.25 or 6 Swiss francs.

LONDON SCHOOL OF TROPICAL MEDICINE.
EXAMINATION RESULT. 78TH SESSION.
APRIL—JULY 1925.

Distinction.

| | |
|--|------------------|
| McKenzie, A. (Winner of "Duncan" Medal). | Sheehan, T. F. |
| Meleney, H. E. | Noble, G. S. P. |
| Martin, K. A. T. | Philip, C. R. |
| Seagar, E. A. | Scott, G. Waugh. |
| Corner, W. E. | Said, A. M. |

** Passed.*

| | |
|-----------------------|---------------------------|
| Wilkinson, W. | Wilkin, B. O. |
| Rice, H. D. C. | Pasqual, J. H. |
| Hans-Raj. | Macleane, C. F. |
| Buchanan, J. C. R. | Malchi, A. |
| Field, J. W. | Willnott, L. A. |
| Sturton, C. | McCandliss, W. K. |
| Stuart, Miss C. A. | Burke-Gaffney, H. J. O'D. |
| Ramakrishnan, A. | Owen-Flood, J. H. |
| Halley, F. M. | Montgomery, S. R. P. |
| Chang, M. L. | Harley, G. W. |
| Lowe, Miss G. | Moir, W. J. |
| Drysdale-Anderson, D. | Davies, J. R. |
| Burn, M. | Durance, Miss D. |
| Comty, R. | Ahlquist, J. A. |
| Armstrong, J. S. | Bennet, Miss M. E. |
| Blake, L. | Wilson, C. S. |
| King, F. H. | Cargill, Miss W. D. |
| Mackay, R. | Marren, M. J. |
| Pilot, I. M. R. | Khourri, Hauna. |
| Eveson, S. W. | Ali, S. M. |
| Keess, Miss I. | Chandra, M. |
| Payne, E. G. H. | Chiang, H. T. |
| Ying, Y. Y. | Macleod, C. B. |
| Nelson, W. | Rahmeh, H. A. |
| Wilson, Carmichael. | Dove, A. F. R. |
| McSwan, D. M. | Rodrigues, M. |
| Mahmood, M. S. | Soliman, I. G. |

"A SCHEME FOR THE IMPROVEMENT OF
THE HEALTH OF VILLAGERS, AND RURAL
SANITATION."

PARTICULARS AND CONDITIONS OF AWARD
OF A GOLD MEDAL.

A GOLD MEDAL called the "Rai Sahib Shambhu Dayal Sahib Gold Medal" will be presented for the best prize essay on a public health subject to be announced each year.

2. The subject for the essay for 1925, is "A scheme for the improvement of the health of villagers, and rural sanitation."

3. The competition will be open to the general public of United Provinces.

4. The essay must be written in Hindi and should not exceed 3,000 words in length.

5. Essay should reach the Director of Public Health, U. P., Lucknow, by the 31st December.

6. The name and address of the competitors must be distinctly written on each essay submitted and the envelope should have the words "Prize Essay" in the top left hand corner.

7. The Director of Public Health, U. P., shall judge the merit of the essay and his decision with regard to the award of the Medal shall be final.

No correspondence will be entered into on the subject of the competition.

No essay will be returned.

BRAND & CO'S INVALID PRODUCTS.

MESSRS. BRAND & Co., LTD., London, have been invalid food specialists for nearly ninety years and during the whole of that time have held the appointment to supply their products to the Royal Household.

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Their Indian representative, Mr. A. H. P. Jennings,

Block E., Clive Buildings, Calcutta, will at all times be pleased to supply literature and price lists upon request.

"TABLOID" HEXAMINE AND METHYLENE
BLUE.

"TABLOID" Hexamine and Methylene Blue is a combination of three grains of hexamine with a quarter grain of methylene blue. The therapeutic activity of hexamine is enhanced by the addition of methylene blue which possesses analgesic as well as antiseptic properties and is equally active in acid or alkaline urine. The combined product should be of value in a variety of biliary and genito-urinary conditions, before and after operations on the kidneys and prostate, in pyelitis, urethritis and septic urinary conditions. "Tabloid" Hexamine and Methylene Blue is sugar-coated and the ingredients are of the high standard of purity and reliability associated with "Tabloid" products.

PHOTOGRAPHIC SIGNPOSTS.

For many years Burroughs, Wellcome & Co. have made it an annual practice to issue a most attractive and really useful booklet on photography.

The booklet "Photographic Signposts" will be sent post free to all readers mentioning this paper and applying to Burroughs, Wellcome & Co., Post Box 290, Bombay.

DIFCO PRODUCTS.

We have just received a very useful little booklet on "Endocrines, Enzymes and Protein Compounds" published by Digestive Ferments Co., Detroit, Michigan, U.S.A., proprietors of the Difco products.

As a result of research extending over a period of years, and a study of the medical and scientific literature available, they have prepared from time to time bulletins giving chemical and therapeutic information in connection with the manufacture and use of "Difco" digestive enzymes and animal derivatives.

This material has been compiled and amplified. It is now presented in the form of a booklet which they believe will prove a convenient reference manual for the manufacturing pharmacist and chemist. The booklet, comprises a summary of the available authoritative information on the subject of endocrines, digestive enzymes and protein compounds.

The Scientific Supplies (Bengal) Co., 29-32, College Street Market, Calcutta, are sole agents in India, Burma and Ceylon for all preparations of the Digestive Ferments Co. and they hold a large stock of their goods.

Publishers' Notice.

SCIENTIFIC Articles and Notes of interest to the profession in India are solicited. Contributors of Original Articles will receive 25 reprints *gratis*, if asked for at the time of submitting their manuscripts.

Communications on Editorial Matters, Articles, Letters and Books for Review should be addressed to THE EDITOR, *The Indian Medical Gazette*, c/o Messrs. Thacker, Spink & Co., P. O. Box 54, Calcutta.

Communications for the Publishers relating to Subscriptions, Advertisements, and Reprints should be addressed to THE PUBLISHERS, Messrs. Thacker, Spink & Co., P. O. Box 54, Calcutta.

Annual Subscription to "*The Indian Medical Gazette*," Rs. 16 including postage, in India. Rs. 18 including postage, abroad.

Papers and articles forwarded for publication are understood to be offered to the *Indian Medical Gazette* alone, and any breach of this rule will be followed by non-publication.

The Editors of the *Indian Medical Gazette* cannot advise correspondents with regard to prescriptions, diagnosis, etc., nor can they recommend individual practitioners by name, as any such action would constitute a breach of professional etiquette.

Original Articles.

A PLEA FOR RESEARCH IN THE TREATMENT OF SQUINT.

By HENRY SMITH, C.I.E.,
LIEUTENANT-COLONEL, I.M.S. (Retd.).

THE present position of the treatment of squint leaves much to be desired. I use the term squint to cover non-paralytic cases and cases in which spectacles are not sufficient. The necessary operative treatment is essentially cosmetic and cannot aspire at aligning the axes in physiological position.

Is it not possible to shorten the rectus muscle at fault without any cutting operation? I hold that it is possible. Take the case of any limb muscle relaxed for, say, 14 days as in the case of fractures in which the joint is fixed in a flexed position. At the end of that time the muscle is shortened and will remain shortened if not forcibly stretched by the surgeon. Take the case which we have often seen in which after flail union following fracture, say of the humerus or of the leg bone, in which we have excised three inches of the bone or bones and brought the ends together. In these cases the muscles are three inches too long when we have finished the operation. The muscles in these cases always contract up to the length necessary to operate the limb. They contract very much more quickly if submitted to electrical stimulation twice daily for a few days. A non-paralysed muscle always contracts up to hardly what we may call a normal tension tonus. In the above cases in doing so it has permanently shortened. Can we not by utilising the principle involved shorten a rectus muscle of the eye? I am confident we can do so. When in Canada four years ago, a girl of ten years of age was brought to me in a small town where I was having a holiday; she had 30 degrees of external squint. I submitted the rectus at fault, under the influence of cocaine for the conjunctiva, to a weak faradic current for 5 minutes at a time, morning and evening, for 5 days. At the end of this time she had but 2 degrees of squint. I had to leave and ordered her the addition of a pair of 1 D. prisms to her glasses. She was intelligent; the observations were taken with a light as the object, without coloured glass or Maddox rods. She could tell exactly where the second light was and from this and the distance I could do the calculations. I have heard from her not long since and she has steadily seen single since the time of treatment.

If I could have used a fairly strong current results would have been more rapid. When I used a strong current the child got nausea and even when I used it for a second sitting nausea soon set in.

There is no risk. If we succeed we can put the axes in physiological position; no other procedure up till the present can aspire to do this.

THE TREATMENT OF INCISIONAL SINUSES.

By H. HALILAY.
LIEUTENANT-COLONEL, I.M.S.,
Civil Surgeon, Simla.

It sometimes happens in the course of an abdominal operation that the wound in the parietes becomes infected, possibly owing to defective technique, or to a breakdown in the sterilising arrangements, or to some chance contamination of the suture material.

Be the cause what it may, the patient is left with a persistent sinus or sinuses which discharge intermittently or constantly, a state of affairs which is a cause of great annoyance and distress to the patient, and very often of loss of prestige to the surgeon.

Abdominal wounds seem peculiarly prone to the development of sinuses, possibly owing to the fact that it is difficult to apply effective pressure in this situation, there is a greater liability to post-operative oozing and the consequent formation of dead spaces in which organisms can multiply.

As a rule, the wound is undermined for the whole of its original length. There may be one or more openings in the scar through which the discharge escapes, but usually the fat and subcutaneous tissues will be found to have united over the sinus which is situated between the sheath of the deep muscles and the subcutaneous tissues.

We thus have a sort of tunnel of granulation tissue placed on the deep fascia and surrounded by a sheath of scar tissue, which becomes denser the longer the condition lasts.

The denser the envelope of scar tissue becomes, the more difficult it is for the local and general defensive mechanism of the body to destroy the invading organisms which infect the lining granulation tissues of the sinus, which constitutes what the older pathologists would describe as a true pyogenic membrane.

It is no doubt due to this impenetrable wall of scar tissue that the chronicity of the sinuses is due; they may persist long after the infected suture material has been absorbed.

In one case which had been operated on for appendicitis in 1918 the wound had supplicated and a sinus had persisted until 1923 when I excised the whole track of the granulation tissue. Although there was no trace of the original suture material in her case, there was none the less a very extensive sinus which had undermined the subcutaneous tissues considerably, and which displayed no signs whatever of healing.

One of the most striking features of these persistent sinuses is the evil effect which they

exercise on the mind of the sufferer, out of all proportion to the area of tissue involved.

The sickness of hope deferred, constant disappointment, endless tinkering with the wound, the presence of an unclean discharge, often in a woman who may have a most exquisite standard of personal cleanliness, all combine to produce a condition of depression and even hysteria in the patient.

The surgeon who has seen a few of these sinuses will realise more keenly than ever that no care, however meticulous, can be too great to avoid infection of the wounds which he inflicts.

That a patient who has been sent into a nursing home to undergo an operation which he or she was told would incapacitate him or her for two or three weeks at the most, should be let in for months or years of this kind of suffering and disability is a blot on the fair fame of aseptic surgery. It may be said that some of these regrettable incidents are unavoidable; this may be so, but it is the duty of the surgeon to see that they are reduced to the irreducible minimum.

TECHNIQUE.

The skin having been carefully cleansed by whatever method of disinfection is favoured by the surgeon, the sinus is opened along its entire extent so that the tunnel is converted into a gutter. The first knife and all instruments used in opening up the sinus are now discarded, and an entirely fresh set of instruments employed. The ribbon of granulation tissue is now dissected out, every endeavour being made to remove it in one piece. With it is also removed the surrounding wall of dense scar tissue. All that now remains to do is to take away a thin slice of the apposing surfaces of the wound down to the oozing gutter left by the removal of the ribbon of granulation tissue. Here again it is necessary to call for a fresh relay of instruments, as we wish at all costs to avoid any chance of re-infecting the freshened wound.

This sounds more formidable than it really is, because the instruments used are few, mostly knife and forceps.

The wound is then carefully swabbed out with tincture of iodine to destroy any chance infection that may have been left behind, and closed by through and through sutures of silkworm gut, in such a manner as to obliterate all dead spaces. No vessels are tied, no suture materials are left in the depth of the wound.

Union as a rule takes place in ten days by first intention, this applies even in cases that have been going on for years, few operations are as gratifying in their results to both surgeon and patient.

SOME ILLUSTRATIVE CASES.

Case 1.—Mrs. G., aged 56. Operation some three months previously, copious discharge, considerable pain and very great mental distress amounting to hysteria.

The sinus was opened up and the track of granulation tissue was dissected out, a suture of phosphor bronze about four inches in length was found tethered to the sheath of the rectus and was removed at the same time. The wound edges were then freshened and the wound closed by through and through sutures of silkworm gut.

Union by first intention was found to have taken place when the sutures were removed in ten days' time.

Case 2.—Mrs. D., aged 32. Operation for appendicitis in August 1917, wound infected and persistent sinus until May 1923, when I excised the sinus.

This patient had suffered much at the hands of many doctors and had lost all hope that the sinus would ever heal. Her morale was much lowered and owing to the fact that exercise had been interdicted, she had put on a great deal of weight. The sinus was dissected out in one piece, the wound freshened, and closed by interrupted silkworm gut sutures. Union by first intention occurred and the stitches were removed on the tenth day.

The moral effect upon the patient was remarkable, she regained her cheerfulness and lost all neurasthenic symptoms as soon as the wound healed.

Case 3.—Mrs. E., aged 38. Operation for appendicitis some five months earlier. Infection of the wound, persistent sinus. Patient very depressed mentally and run down physically. Had been in bed since the operation.

Complete excision of the old sinus and scar tissue, sides of the wound freshened, wound closed by through and through sutures of silkworm gut. Union by first intention. Immediate amelioration of all neurasthenic symptoms, and she commenced to put on weight as soon as the wound closed.

These three cases are sufficient to illustrate this brief article; it would serve no useful purpose to multiply them. I have merely quoted them to show how rapidly these troublesome sequelæ can be cut short, and how rapidly the sufferers regain their former morale and health as soon as the sinuses close.

PELVIC MEASUREMENTS IN INDIAN WOMEN.

By G. STAPLETON, M.D., B.S. (Lond.),

Women's Medical Service.

Acting Principal, Women's Medical School, Agra.

As medical students in this country usually read English midwifery text-books, and not infrequently forget the difference in stature that exists between women of the East and West, it was thought advisable to take a series of pelvic measurements in Indian women to see how far they varied from the text-book figures. Two hundred cases were examined, all being patients who had been admitted to the Dufferin Hospital at Agra for labour at or near full term. They were consecutive as far as possible, only certain patients who had been transferred to another ward for sepsis and others who left the hospital without permission being omitted. The examination was made at the time of their discharge on the 8th or 10th day after delivery, or later, and the measurements were all made by one observer in order to avoid any variation due to the personal factor.

The women were mainly of the middle and poor classes, and the majority came from Agra

city. Nearly three-quarters were Hindus, three Christians, two Parsees, and the rest Mussalmans. Of the total number, 25 patients were considered to have contracted pelvis of some variety.

EXTERNAL MEASUREMENTS.

The mean external pelvic measurements of the whole 200 patients, worked out to the nearest second decimal figure, were found to be:—

| | |
|-----------------------|--------------|
| Intercristal .. | 9.60 inches. |
| Interspinous .. | 8.54 " |
| External conjugate .. | 7.07 " |

The intercristal measurement was taken between the outer lip of the widest part of the iliac crests, and the interspinous between the most prominent part of the anterior superior spines.

If the 25 cases of contracted pelvis were excluded, then the figures were:—

| | |
|-----------------------|--------------|
| Intercristal .. | 9.69 inches. |
| Interspinous .. | 8.67 " |
| External conjugate .. | 7.22 " |

Only two of the whole series showed an intercristal measurement which approached the English standard, i.e., 11 inches or over.

THE DIAGONAL-CONJUGATE.

All the patients were submitted to a vaginal examination and an attempt made to measure the diagonal-conjugate with the fingers. It will be seen from the following table that the promontory of the sacrum could be felt in over two-thirds of the cases:—

| | |
|--------------------------------------|-----------|
| Promontory not felt in 63 cases. | |
| D.C. 4 $\frac{1}{2}$ inches .. | 10 " |
| " 4 $\frac{1}{2}$ " .. | 65 " |
| " 4 $\frac{1}{2}$ or 4+ " .. | 39 " |
| " 4 " .. | 13 " |
| " 3 $\frac{3}{4}$ " .. | 4 " |
| " 3 $\frac{1}{2}$ " .. | 2 " |
| " 3 $\frac{1}{4}$ " .. | 2 " |
| True conjugate 2 fingers' breadth .. | 1 " |
| Conjugate not taken .. | 1 " |
| | <hr/> 200 |

In the cases of the first group, it could not always be taken for granted that the D.C. was 4 $\frac{1}{2}$ or more inches, as failure to reach the promontory was sometimes due to factors such as a recently healed tear of the perinaeum against which it was unwise to exert much pressure, rigidity of the pelvic floor, loaded rectum, rigidity of the vaginal vault, and in one case, great contraction of the bony outlet.

In the second group, the opposite conditions obtained, and it was only owing to the extremely relaxed state of the perinaeum that the fingers could stretch 4 $\frac{1}{2}$ inches. In the one case in which the conjugate was not taken, there was an extensive scar of the vaginal vault due to recent incision for total atresia of the cervix.

From the above figures one can calculate that the mean of the diagonal-conjugate in Indian women patients in Agra is nearer 4 $\frac{1}{2}$ than 4 $\frac{3}{4}$ inches.

CONTRACTED PELVIS.

All the patients in whom the diagonal-conjugate was found to be 4 inches or less were considered to have contracted pelvis. Three cases of slightly flattened pelvis with a diagonal-conjugate of 4 $\frac{1}{4}$ inches or just under were also included in this group.

The cases were classified as follows:—

| | |
|---|-------------|
| 1. Simple flat pelvis .. | 5 patients. |
| 2. Generally contracted pelvis .. | 8 " |
| 3. Osteomalacia pelvis .. | 12 " |
| (sometimes of the severe triradiate type) — | <hr/> 25 |

In a large proportion of the cases in the first two groups the contracted pelvis was found accidentally, as three of the simple flat and six of the generally contracted type had had normal labours, while the remaining two of the latter class succeeded in delivering themselves after some delay. Two of the cases of flat pelvis required craniotomy as the diagonal-conjugate was only 3 $\frac{1}{2}$ and 3 $\frac{3}{4}$ inches respectively, and the children were dead. In the osteomalacia class, nine underwent Cæsarian section, one was a forceps case, and the remaining two delivered themselves, though in one of these labour was abnormally prolonged.

WEIGHT OF THE INFANTS.

The average weight of the infants whom the mothers thought they had carried to full term, worked out to just under 6 lbs., i.e., 5.96 lbs. Some of these babies however were very small and puny, and probably not quite full term, so that the average weight at the full nine months should have been a little over 6 lbs.

As regards delivery, the size of the child in relation to the mother's pelvis was of far more importance than its actual weight and the actual measurements of the mother.

In some cases however one was surprised by the comparatively large size of the baby that came normally through a small internal-conjugate. One 4-para with a diagonal-conjugate of 4 inches delivered herself of a living 7 $\frac{1}{2}$ lb. child in 21 hours, and said that all her previous labours had been quite normal, and another 3-para with D.C. of just over 4 inches had a 7 lb. child after 15 $\frac{1}{2}$ hours in labour, and gave a similar history. The soft heads of Indian babies which appear less extensively ossified than those of European children may be the cause of the large amount of moulding that can take place.

CONCLUSIONS.

1. The average external pelvic measurements of Indian women in the Agra District, excluding those with abnormally small pelvis, are:—
I. S. under 8 $\frac{3}{4}$, I. C. under 9 $\frac{3}{4}$, E. C. 7 $\frac{1}{4}$ inches.
2. The diagonal-conjugate is on the average 4 $\frac{1}{2}$ inches.
3. The average weight of the babies at birth is 6 lbs.
4. Slight grades of flat pelvis are found apart from any history of osteomalacia or rickets.

FAMILIAL TREATMENT OF THE INSANE.

By OWEN BERKELEY-HILL,

MAJOR, I.M.S.,

RECENTLY I have come to know that a body of representative opinion in this country decided unanimously that familial care of the insane in India is "impossible." As the reasons alleged by these persons in support of their opinion are by no means evident and as each single individual concerned has never had any personal experience of the familial treatment of the mentally afflicted, we are at liberty to presume that the sphere of mental medicine in India has got to share the lot of every other domain of human activity and suffer from prejudice unadulterated by one element of rationality. Is it too late to attempt at this eleventh hour to introduce a leavening particle of fresh thought into the existing conceptions of the care and treatment of the insane? Is it no longer possible to persuade people that we are perhaps lingering over-long at the stage of building huge caravanserais in which the insane have an environment which still leaves much to be desired for this type of system? Are we not perhaps hypnotised by the idea that we have reached the limit of endeavour to alleviate the lives of those who are victims of mental disease? Is this extreme measure of segregation away from society the ideal to be aimed at for the treatment or comfort of our patients? Is it also good for the social community? To a large extent at present so-called treatment merely means institutional confinement. The attitude of the medical profession and even of many psychiatrists is such that they tend to regard relegation to a mental hospital as the safest and most correct procedure when an individual shows any signs of mental abnormality. It is grievous to realise the number of cases which are disposed of in this manner, but which with care and understanding never need have been secluded within walls. For years, I have held that familial treatment of Anglo-Indian and Indian insanes is not only a possible but an inevitable development. I have studied a great deal of literature on the subject and have made a thorough examination on the spot of the greatest experiment in familial treatment of the insane to be found in the whole world, namely the colony at Gheel in Belgium. A very interesting account of the colony at Gheel was published by Dr. C. Stanford Read in the *Journal of Mental Science* in 1921, and as it is impossible in my opinion to improve upon it, I shall quote it extensively.

"Gheel is a small Belgian town not far from Antwerp having a population of over 15,000 in its nine parishes. Within this area some 1,500 certified mental patients are boarded and cared for in households. Under this system the patient lives as one of the family and has no restrictions placed upon his freedom, except that he must

be 'home' by 8 P.M. in the summer and by 4 P.M. in the winter, and is not allowed to be served with alcoholic refreshment without special permission. A patient arriving at Gheel, unless there are special indications otherwise, is placed in the Infirmary for observation, so that the Medical Director can study the type of case he has to deal with and can make sure that it is one suitable for the system. If at any subsequent time any illness should arise requiring special medical attention, or should any episodic outbreak of recalcitrancy or violence be manifested, the patient can be temporarily transferred to this Infirmary where he will be under a stricter and a safer régime. As soon as a case is sufficiently understood, the question as to which family he or she shall be relegated to has to be decided. This is always an important point, which depends not only on the social class of the individual but upon the patient's choice and perhaps that of the relations, and also upon the Medical Director's knowledge of the special adaptive requirements needed, and the families where he is most likely to meet such. It not frequently happens that a patient has to change his milieu more than once before he feels he is in a correct environment in which he can feel at home. The families themselves take a highly active interest in the happiness and welfare of their charges so that their co-operation in the work may always be counted upon. This care for the mentally afflicted is quite voluntary and any *nourricier* has to be able to show evidence of an irreproachable character before the great responsibility is allowed. Indeed, any family to whom it is not considered advisable to entrust a patient, lives in perpetual shame. The Medical Director told me that no man could get his daughter married if it could be proved that a patient had never been allowed to dwell in the girl's family. The pecuniary emolument is very small. At the time of my visit what is termed 'First Class' accommodation cost six hundred francs a year, that is about Rs. 85. This sum procures a pleasant bed-sitting room and excellent food.

"Through Christian influence and through the accumulated traditions of twelve centuries, the insane have come to be regarded by the people of Gheel, not as individuals who are to be shunned and feared and placed without the pale of society, but as sufferers from disease which may be cured or alleviated, or who, at any rate, may have their lot rendered happier and less burdensome by human understanding, kindness and sympathy. The *nourricier* takes a pleasure and much trouble in smoothing away the adaptive difficulties which beset his patient's path, and only too gladly works hand in hand with the medical officer with this common object in view. It might be supposed that the familial care system involving an intimate mixture of the insane and sane must in time have a deleterious effect on the latter; that with so much liberty given to those who presumably lack inhibition, immorality is bound to be rife; and

that the possible dangers of escape, violence and suicide will be difficult or impossible to control. In practice none of these fears have been found verified. The mental health of the population of Gheel has always compared most favourably with that of other Belgian towns; immorality and illegitimacy are at a minimum; and it is very infrequently that any injury to person or property is reported. The contentment of the great majority of the patients is such that the idea of escape from their environment does not easily enter their minds. Further it seems that all forms of mental alienation can be treated on the familial system, though it is obvious that those who after observation show a continued anti-social tendency, and those who thereby may be a danger to themselves and others, or who would offend the public decency, must be segregated away from the community in institutions. The experience of Gheel demonstrates that many insanes who show dangerous proclivities in their own homes become quiet and peaceful in the colony. It is recorded that a violent maniac who had to be brought to Gheel tightly bound down with ropes to a hand-barrow and guarded by two men, which was thought necessary to ensure safety, permitted himself to be led about contentedly by a child of his *nourricier*."

It may here be asked whether such a system as that of Gheel proves its superiority by showing a greater percentage of recoveries. This can hardly satisfactorily be answered, because in this instance we are only dealing with numbers specially selected, and so any statistics would be extremely misleading. Such a question, however, is to some extent beside the point, for though it might be possible that with our present great ignorance of the pathology of mental disease the ratio of cured might be no higher, the fact remains that under such a system the patients live a more normal life, one easier of adaptation and therefore a happier one, and it too seems proved by experience that truly demented states are thereby lessened, prevented, or retarded; for modern psychopathology teaches that much that passes for dementia is the giving up of all attempt at adaptation because the task is too formidable.

Now, as far as I am aware, the gist of the objections to the introduction into this country of the Gheel system, or some modification of it, is that it is incompatible with the manner of life of the people. Certainly want of pity is more characteristic of Asiatics than of Europeans but this defect is not irremediable. At the present moment in India a good deal is being done in this direction by societies for the welfare of children, the prevention of cruelty to animals, and so on. In any case, I am strongly of the opinion that the supposed impracticability of the adoption of some familial system in this country is much overrated and founded largely upon inertia, ignorance and apathy. It is quite true that the Gheel system is the slow and successive product of centuries and that in a day one could not imitate

it in India. It is, therefore, that the more intelligent portion of the community wants educating to view mental affliction in a very different light from the way in which it is viewed at present. Probably no better education could exist than the establishment of experimental colonies at such places as Ranchi and Bangalore. It is needless to say that opposition would be met with on every hand, even from the medical profession itself; but in course of time arguments against the system would be proved to be baseless, and mental hospitals would only exist for those who by no manner of means could be looked upon as possible members of the social community, even under supervision. For the success of such a colony the Medical Director must be a physician possessing special attributes. His psychiatric knowledge must be extensive and practical; he must be a man of the world and be capable of taking wide viewpoints; he must essentially be humanistic, patient, and sympathetic, and be capable of rapidly gaining the patient's confidence and be looked upon as a friend as well as a physician; he must be a good organiser and possess infinite tact to smooth away the often trivial adaptational difficulties of those under his care.

He must not be, as are most medical directors of mental hospitals, clamped down under the fetters of petty detail and fed upon the mean diet of compromise and routine. He must be protected from interference from the most recent products of political quackery, that is to say, creatures ready at any moment to institute the meanest of intrigues so long as there is a ray of hope that some political advantage, however small, may be gained therefrom. Lastly, he must be paid a reasonable salary and permitted to have the freest hand in the selection of his staff as well as in the rejection of persons who turn out to be either fools or shirkers, or both.

THE ABUSE OF EMETINE.

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CAPTAIN I.M.S.,

Dera Ismail Khan.

THE addition of emetine by Sir Leonard Rogers to the therapeutic armamentarium of the tropical practitioner has undoubtedly led to great improvement in the treatment of amoebic dysentery and has proved a perfect Godsend in the treatment of amoebic hepatitis and liver abscess.

As is very apt to happen however when new and potent drugs are introduced, emetine has been taken up somewhat too enthusiastically and is looked upon by many practitioners as a sort of panacea for all intestinal troubles and as the chief drug indicated in all cases of intestinal flux and of obscure abdominal pain.

As a result, not only is valuable time wasted in the diagnosis of cases by the application of that abominable, though classic, diagnostic

measure—the therapeutic test—but many patients who present no indications whatever for the exhibition of emetine are subjected to the discomfort and—in some cases—danger of injections of this alkaloid.

The practice of “in diarrhœa try the effect of emetine” is almost as common as that of “in fever try the effect of quinine” and is even more disastrous in its results; and it is on account of a growing conviction of the urgent and very real necessity for a much more widespread recognition of the harm done by the administration of emetine at random, especially to patients who are up and about, that the writer has been tempted to put forward these remarks so soon after the publication in these pages of the very comprehensive and admirable articles on the dysenteries of India by Majors Acton and Knowles, I.M.S.

During the first two years of his service in the East, the writer had the good fortune to work under the daily supervision of a distinguished medical toxicologist who was wont to lay great stress on the fact that emetine is a highly toxic drug which is to be administered only when absolutely indicated and with the patient at rest in bed.

The first and foremost point to be attended to is that emetine should only be given when the intestinal trouble is caused by the *Entamœba histolytica*.

In military practice microscopic diagnosis is the rule, in peace time at any rate, and in civil urban practice the same should hold good. In time of war, cases of bloody diarrhœa were often treated in forward areas by emetine injections, often with ambulatory patients, and although this was at times unavoidable it was undoubtedly responsible for reducing the vitality of men who were not suffering from amœbic dysentery.

In civil dispensary work more might be accomplished than is, in the way of microscopic diagnosis, though the facilities which exist at present in India for the training in microscopic work of the all-important medical subordinates are admittedly inadequate to fulfil the demands for such training.

In rural private practice amongst the poorer classes microscopic examinations are rarely carried out and blind and tentative treatment of patients passing blood and mucus may have to be condoned but, as a general rule, it is fair to say that the practitioner who administers emetine without having obtained microscopic evidence of the presence of the *Entamœba histolytica*—in whatever phase—in the stool, probably does his patient more harm than good.

The writer's own practice has been to admit cases of dysentery, however slight, to hospital, whenever possible, in order that an accurate diagnosis might be made.

This has been easy, as a large proportion of one's practice has been amongst the military population, but in civil and private practice, and especially in attending the wives and families of officers and officials in stations where no suitable

hospital accommodation existed for their reception one has had, of necessity, to carry one's own microscope to the house of the patient concerned. The stool has then been examined a few minutes after it has been passed.

It is a common practice to send samples of stools to the nearest laboratory in cigarette tins or similar receptacles and to hope to get a reliable report. Unless, however, means are adopted to ensure the maintenance of the faeces at a suitable temperature the results in the majority of cases are nearly worthless.

My colleague, Major J. B. Hance, I.M.S., informs me that he obtains satisfactory results in a considerable proportion of cases by instructing the patient to put a sample of a freshly passed stool into a slightly warmed cigarette tin which is then placed in a larger tin containing warm water, forming a hot water jacket. The whole is then sent by swift messenger to the laboratory where it is placed in a warm incubator until the time of examination. A warmed thermos flask is, of course, the ideal means of transmission to the laboratory, with the faeces in a test tube which is wrapped in cotton-wool to obviate breakage of the flask.

The excellent arrangement which prevailed in Mesopotamia whereby the officer in charge of the hospital laboratory had also charge of the dysentery wards was almost ideal and tended to prevent the arrival in the laboratory for examination of cold, stale faeces.

The diagnosis of amœbic dysentery having been made, the patient should be kept in bed and made to use a bed pan during the whole course of treatment with emetine. This is not only necessary in order to afford rest to the ulcerated gut, as pointed out by Majors Acton and Knowles, but is further most essential in order that as little damage as possible be done to the cardiac mechanism.

The specific action of emetine on the cardiac mechanism is not sufficiently realised, as one is constantly meeting with cases treated in an ambulatory or semi-ambulatory fashion.

This is notably the case with better class patients in both military and civil practice.

The soldier or sepoy can be ordered off to hospital with impunity, but one finds great reluctance on the part of busy military and civil officers and officials, especially seniors, and amongst business men to lie up, with the result that there is often a tendency to treat mild attacks of amœbic dysentery without the patient being sent to bed.

One has, as a result, come across quite a number of cases during the past few years, of post-emetine debility, the patients concerned becoming profoundly debilitated and neurasthenic, with flabby, dilated hearts, rapid, irregular and easily compressible pulses and requiring prolonged rest in order to restore even partial health.

One case, indeed, came to my notice not long ago in which an athlete was permitted to enter and compete in a series of strenuous athletic

events in the hills whilst undergoing ambulatory treatment with emetine injections at the hands of a well-qualified and experienced civil practitioner.

One was not surprised when the competitor referred to confessed to "feeling like death" shortly after the commencement of the tourney, and an ashy-gray colour and shortness of breadth, obvious to all around, were plain evidence of cardio-vascular poisoning.

One can also remember the cases of two patients who suffered severely from post-emetine toxæmia and in whom from the very beginning the condition (amoebic dysentery) had never been shown definitely to exist.

The sword of Damocles, in the shape of a civil suit for damages, which nowadays hangs over the head of every practitioner in the United Kingdom who undertakes the treatment of fractures without x-ray control, may very shortly dangle over those in India who treat dysentery without microscopic control, and sooner or later the fall is bound to come.

A LECTURE ON BLOOD SUGAR AND SUGAR TOLERANCE.

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ALL the sugars and starches of the food after digestion in the intestine are absorbed into the blood in the form of monosaccharides, chiefly glucose, partly lævulose and galactose. The bulk of the ordinary diet of human beings, especially in the tropical and subtropical countries, consists of various carbohydrates. On rough estimation it is believed that they form, about two-thirds or even more of the entire diet. Besides the carbohydrates about 60 per cent. of the protein amino-acids and about 10 per cent. of fat are converted into glucose in the course of metabolism. Glucose is ultimately oxidised into CO_2 and water and furnishes the greater part of the energy which is manifested in the shape of muscular work and production of heat. The metabolism of glucose thus represents one of the most important reactions taking place in the animal body.

In this paper I propose to deal briefly with

(a) Concentration of glucose in blood in a normal human being, and the changes that occur before and after taking food;

(b) The relationship that exists between the sugar of blood and of urine;

(c) The alteration of blood sugar that occurs in disease.

METHODS FOR THE ESTIMATION OF BLOOD SUGAR.

All the methods depend on the reducing properties of glucose. They can be divided into two groups—

(a) *Titrimetric group*: in which the reduction of cupric to cuprous oxide in alkaline solution is determined by titration of the latter. Bertrand's, Bang's and Maclean's methods, with their numerous modifications belong to this group.

(b) *Colorimetric group*: in which the production of red colour by reduction of picric acid to sod. picramate in the presence of sod. carbonate is determined by means of a colorimeter, e.g., Benedict's method.

In all my experiments I have employed Maclean's method for estimation of blood sugar for 0.2 c.c. of blood. Blood is deproteinised by heating in an acid saline solution, and the protein is removed by filtration after addition of dialyzed iron. The sugar is estimated in the filtrate by boiling with alkaline copper solution. The quantity of cuprous oxide formed is determined iodometrically.

Colorimetric methods, such as Benedict's, generally give higher results than Maclean's. This is probably due to the fact that the results by these methods include substances other than glucose, such as creatinine. All methods, however, are fairly serviceable, but the great point is to stick to one method, when once adopted, if reliable results are to be obtained. For accurate work Maclean's method is to be recommended. One of its great advantages is that only a very small quantity of blood readily obtained by a fingerprick is needed for estimation, and the samples can be obtained at frequent intervals without much discomfort to the patients.

PERCENTAGE OF SUGAR IN BLOOD.

The sugar content of blood is markedly affected by the intake of food, specially that rich in carbohydrates. It is therefore necessary to estimate it either in the morning before breakfast, or 3 to 4 hours after the last meal to prevent any discrepancies. This is regarded as the normal "fasting" level of blood sugar, which remains remarkably constant in health, and lies between 0.07 per cent. and 0.12 per cent., the average figure taken as a standard for comparison being 0.1 per cent.

After administration of 50 grms. of glucose or intake of rich carbohydrate diet, the blood sugar rises, reaching a maximum in half to one hour, and then declines, till it reaches its former basal level of 0.1 per cent. in $1\frac{1}{2}$ to 2 hours. In normal adults the maximum level reached is 0.17 per cent. Spence (1921) has shown that in children under 3 years of age the rise in blood sugar is very much less marked.

In children over 3 years of age the blood sugar curve is like that of an adult. There are no differences between the two sexes as regards blood sugar.

In old age the curve is prolonged. In healthy persons over 60 years, the high level of blood sugar, i.e., 0.13 to 0.14 per cent. may be maintained for 2 hours or more, before it tends to return to its normal level.

The maximum level of 0.17 or 0.18 is regarded as the threshold value of sugar, for if the amount exceeds this level glycosuria occurs. Maclean and his co-workers insist that in healthy subjects with normal kidneys no excretion of sugar takes place until the concentration in the blood reaches about 0.18 per cent., and it is difficult or impossible to produce a concentration beyond this level.

These figures are based on the estimations made by European and American workers on the blood of persons who habitually live on a mixed diet of meat and vegetables. In India the dietary of the majority of the population differs markedly from that in western countries in that it consists almost entirely of different varieties of carbohydrates. In order to ascertain the normal blood sugar value of Indians and their tolerance for sugar, Coelho and I have worked together in the Physiological Laboratory for some time and a paper based on our observations is now under publication. I shall quote here in some detail some of the data we have obtained and the conclusions arrived at.

EXPERIMENTAL.

The normal blood sugar and sugar tolerance test were determined in vegetarians and non-vegetarians. Altogether 38 individuals between the ages of 17 and 40 were examined, of whom 26 were medical students, 2 members of the teaching staff, and 10 laboratory servants. They were all normal individuals doing their ordinary work. Of these 18 were vegetarians and 20 non-vegetarians. There was much difficulty in dividing them into these two categories, for all Indians partake of large quantities of carbohydrates. Even those who are not strict vegetarians do not take meat habitually, and on the average not oftener than once a day.

For the sugar tolerance test, as suggested by Maclean, 50 grms. of glucose dissolved in 150 c.c. of water were given by mouth. Blood sugar was estimated at half-hourly intervals for 2 hours after the administration of glucose. Urine was examined at one-hourly intervals after the administration of glucose. In some cases 50 grms. of cane-sugar were given instead of glucose. The experiments were performed either in the morning (i.e., after the night's fast) or in the afternoon about 4½ to 5 hours after the last meal.

1. *Non-vegetarians.*—The average blood sugar of 18 individuals was 0.116 per cent., the extremes being 0.083 and 0.147 per cent.

2. *Sugar Tolerance Test.*—15 individuals were given 50 grms. of glucose and 3.50 grms. of cane-sugar. In all cases this was followed by a distinct and rapid rise of blood sugar.

(A) *First 15 individuals:*—

| | |
|---|--------|
| Average blood sugar at the end of ½ hr. was | 0.148% |
| " " " " " " " 1 " " | 0.146% |
| " " " " " " " 1½ hrs. " | 0.122% |
| " " " " " " " 2 " " | 0.114% |

Speaking generally, the blood sugar reaches a maximum from half to one hour after glucose,

and then shows a decline. At the end of 2 hours in 9 cases it was actually below the pre-glucose level. In 2 cases the difference was 0.001 or 0.002 per cent. which is negligible. In the remaining 4 the amount was still above the normal. Of these, 2 had a distinct glycosuria at the end of the first hour.

The maximum rise in the blood sugar in this series was 110 mgm. and the lowest 13 mgm., the average being 49 mgm.

(B) *Last 3 persons*, who were given cane-sugar, had all a high blood sugar level to begin with. The maximum rise in the blood sugar was 99 mgm., and the lowest 25 mgm. Except in one case, the blood sugar remained high at the end of two hours. All these three cases had glycosuria.

VEGETARIANS.

1. *Blood Sugar.*—The average blood sugar of 26 individuals in this series was 0.149 per cent., the extremes being 0.084 per cent. and 0.242 per cent.

This figure is much higher than that obtained from the non-vegetarians. It was observed that estimations made in the morning before breakfast gave a lower figure than those made in the afternoon about 4½ hours after the morning meal.

2. *Sugar Tolerance Test.*—7 were given 50 grms. of glucose, and 13, 50 grms. of cane-sugar.

(A) 7 persons, given 50 grms. of glucose.

| | |
|---|--------|
| Average blood sugar at the end of ½ hr. was | 0.140% |
| " " " " " " " 1 " " | 0.137% |
| " " " " " " " 1½ hrs. " | 0.109% |
| " " " " " " " 2 " " | 0.104% |

The blood sugar showed a rise, which reached a maximum in 30 to 60 minutes after glucose. This was followed by a decline. At the end of 2 hours, in 4 out of 7 cases, the blood sugar came down to the pre-glucose level. In the remaining 3 it was still higher than before. The maximum rise varied in different individuals. The average figure for 7 individuals is 47 mgm., the extremes being 84 and 12 mgms. respectively.

(B) In the remaining 13 cases, who were given cane-sugar, there was likewise a rise in blood sugar followed by a decline.

| | |
|---|--------|
| Average blood sugar at the end of ½ hr. was | 0.209% |
| " " " " " " " 1 " " | 0.189% |
| " " " " " " " 1½ " " | 0.177% |
| " " " " " " " 2 " " | 0.158% |

In all these cases the initial blood sugar was comparatively high. At the end of 2 hours, in 5 persons, it came down to the pre-glucose level or lower.

In two others the difference was of 2 or 5 mgms., which is negligible. In all the remaining 6, the difference was quite marked, ranging from 12 to 38 mgms. above the pre-glucose level.

The maximum rise varied considerably between 127 mgms. and 2 mgms. If it is permissible to arrive at an average figure from results which

vary so much, the average rise would be about 48 mgms.

SUGAR IN URINE.

I. *Non-vegetarians.*—Of 18 non-vegetarians, 4 had a trace of sugar in the urine prior to the test. After taking 50 grms. of sugar (glucose or cane-sugar), in addition to these 4, which continued to show glycosuria, glycuressis occurred in the other individuals also. Thus 5 fresh individuals showed glycuressis one hour after taking sugar, and 2 showed the same after 2 hours, their urine originally having been sugar-free. The quantity was not very large, ranging from 0.1 per cent. to 0.8 or 0.9 per cent.

II. *Vegetarians.*—Amongst the vegetarians, in 10 out of 20 in our series the urine showed a trace of sugar. The urines passed in the morning before breakfast were generally sugar-free, but in the same individual, if the urine was tested in the afternoon some hours after breakfast, a trace of sugar was often seen to be present. One hour after the administration of sugar the urine contained traces of sugar in 15 individuals, of whom 5 were those whose urine was originally sugar-free.

After 2 hours, 12 still showed a trace. This persistence and frequency of glycuressis amongst vegetarians is very significant. The sugar tolerance test indicates that in both vegetarians and non-vegetarians in our series the renal threshold for sugar was comparatively low. Amongst non-vegetarians, in all, except two whose blood sugar rose above 0.142 per cent., there appeared a trace of sugar in the urine. Amongst vegetarians the renal threshold is also in the neighbourhood of 0.143 per cent. The glycuressis was commoner in vegetarians. It would seem as if persistent ingestion of a rich carbohydrate diet lowers the threshold value of sugar.

This leads us to the consideration of the source of blood sugar and the manner of its disposal in the body.

The addition of glucose in the blood is the result of

- (a) Absorption from the intestine;
- (b) Hydrolysis of glycogen (glycogenolysis), especially in the liver and partly in muscles;
- (c) New formation of glucose out of non-carbohydrate material, namely, amino-acids, etc.

Disappearance of glucose in the blood is the result of

- (a) Oxidation in the tissues;
- (b) Excretion by the kidneys;
- (c) Conversion into glycogen, and its storage, as such in liver and muscles;
- (d) Conversion into non-carbohydrate, such as fat.

All these factors do not act to an equal degree in regulating the normal sugar content of the blood. When 50 grms. of glucose is administered to a healthy adult, blood sugar rapidly rises but does not increase beyond a certain level, and the agencies responsible for subsequent fall may

be either oxidation, excretion, or conversion into glycogen. Increased oxidation does take place to a certain extent. It has been estimated by Sanger and Hun that the excess of sugar thus oxidised during 2½ hours after intake of glucose accounts only for 18 per cent. of sugar. The main factor, however, is the storage of glucose in the liver and tissues as glycogen. Sugars which are poor glycogen formers (such as galactose) produce a much higher rise in blood sugar than glucose. On the other hand, *laevulose*, which is a good glycogen former, when administered produces no rise of sugar in peripheral blood if the liver is functioning normally, for the reason that it is rapidly and completely converted into glycogen.

Another significant fact which supports the storage hypothesis is that the sugar tolerance curve obtained from venous blood is lower than that from arterial blood, as obtained by finger-prick. This diminution represents the loss of blood sugar after the blood has circulated through the tissues. This loss is due to storage in muscles, which contain more than half the glycogen content in the body. This storage mechanism is at its height when the blood sugar is rapidly falling after the first hour. It is found that a second dose of glucose during this phase of active glycogenesis does not produce a second rise in blood sugar. In some individuals, however, it may produce a slight rise, but it never reaches its former maximum level.

"THRESHOLD" VALUE OF SUGAR.

Recent research has clearly established that normal urine contains traces of sugar. Benedict, Osterberg and Neuwirth (1918) have shown that in an apparently healthy person having no diabetic tendency, as much as 0.6 per cent. of sugar may be present after a breakfast rich in carbohydrates, and in 24 hours the total sugar passed in urine may amount to 1.586 gm. (0.184 per cent.). If the same person is given an ordinary mixed diet, the total sugar eliminated may approximate to 1 gm. per day. The output of sugar in urine after a meal follows a curve similar to that of blood sugar, but slightly delayed in time. In both, there is an increase followed by a decline. There is a close relationship between the percentage of blood sugar and sugar in urine. Benedict has even shown that each meal is followed by a rise in urinary sugar irrespective of the nature of the diet, suggesting that ordinary digestive processes have an accelerating effect on glycogenolysis.

Now, when blood sugar reaches a level of 0.18 per cent. abnormal traces of sugar appear in the urine. This threshold value of the normal kidney is not easy to account for. Certain experiments by Hamburger are of interest in this connection. He performed certain perfusion experiments on frog's kidney, and came to the conclusion that glucose occupies a peculiar position among isomeric monosaccharides with regard to glomerular epithelium, suggesting the relation

of a key to a lock. According to him the configuration of the glucose molecule gives to it those peculiar properties which cause it to be retained in circulation by a healthy kidney. He further found that the permeability of glomerular epithelium for sugar could be diminished or increased in experiments with frog's kidney perfused with Ringer's solution, if the proportion of inorganic constituents in the perfusion fluid were altered. In this respect, the concentration of free calcium ions and sod. bicarbonate are important factors. When free calcium ions reached a certain concentration the kidney became impervious to glucose, but when this was altered it became permeable. It was also found that in the absence of sod. bicarbonate, the kidney became very permeable and no glucose was retained. As regards the permeability of the kidney to dextrose, calcium and sodium seem to have opposite effects, and it follows that the composition of the blood as regards calcium and sodium, and also its acid-base equilibrium are important factors in sugar excretion. Now, this threshold value which is regarded as 0.18 per cent. is distinctly low in the majority of the subjects of our experiments. It seems to be in the neighbourhood of 0.15 per cent.

HYPOGLYCÆMIA.

1. *Renal Glycosuria*.—In the condition known as renal glycosuria it is said that there is an increased permeability of the kidney to glucose, that with a normal blood sugar level glycosuria occurs, and this is ascribed to the low "threshold value" of sugar. Such cases do occasionally occur.

The urine may contain even 2 per cent. of sugar when the blood sugar content is less than 1 per cent. The usual symptoms of diabetes are absent. If Hamburger's hypothesis regarding the renal permeability to glucose be accepted, this condition would be due to a low percentage of calcium in the blood. Cammidge records certain cases in which there was a diminution of calcium content of the blood in such cases. This has an important bearing on treatment. Such cases of renal glycosuria have been treated by Cammidge by allowing ordinary mixed diet, gr. 1|10 parathyroid nightly, and 5 grs. of calcium chloride three times a day after meals, with some improvement. It might be pointed out that in dealing with this condition great care should be taken not to confuse it with early cases of true diabetes.

2. *Hypoglycæmia resulting from Insulin Injection*.—An injection of insulin in diabetic or normal subjects is followed by an immediate fall in blood sugar, reaching its maximum in 2 to 4 hours. With intravenous injections the effect is very rapid, but with subcutaneous the duration is variable. The degree of hypoglycæmia which is attended by definite symptoms depends on individual idiosyncrasy. The symptoms may arise in one case with blood sugar of 0.07 per

cent., in another not until it has fallen to 0.035 per cent. As a rule, however, when blood sugar has fallen to 0.035 per cent. the person becomes unconscious. Initial symptoms are sweating, nervousness, flushing, tremulousness and rapid pulse, also excitement, and delirium developing into coma. In rabbits convulsions occur, but not as rule in men. These symptoms can be rapidly cured by a dose of glucose together with an injection of epinephrin.

3. *Hypoglycæmia resulting from injury to the liver*.—When the liver is cut out from the circulation, symptoms of muscular weakness, twitching, generalised convulsions and death supervene. Blood sugar falls, and symptoms make their appearance when its level is 0.04 per cent. The condition is relieved by administration of glucose.

4. Renal threshold for glucose is lowered in early diabetes and in early pregnancy.

HYPERGLYCÆMIA.

1. *Diabetes Mellitus*.—In this condition, which is due to damage to cells of the islets of Langerhans (B. cells) of the pancreas, the highest known percentage of blood sugar is met with. The average percentage in mild cases is 0.3 to 0.4 per cent. but I have records of a case showing over 0.6 per cent. The maximum record is 0.7 to 0.8 per cent. The capacity for storing and oxidising carbohydrate is diminished. In all cases of glycosuria whose true cause is not evident, it is essential to estimate the blood sugar and carry out the sugar tolerance test, as already described. This will give evidence of hyperglycæmia, and the curve characteristic of this disease. If 50 grms. of glucose is given to a case of diabetes, the blood sugar rises slowly and the rise is much prolonged, reaching a level not met with in a normal individual. The return of blood sugar is also very slow, and the total duration of hyperglycæmia is much greater than in health, lasting up to 3 or even 4 hours.

Blood sugar rises above the renal threshold and definite and marked glycosuria occurs. So in diagnosing a case of diabetes, the height and duration are both important, especially the latter. In early cases, the characteristic feature is the slow descent. It will be obvious that estimation of urinary sugar does not alone give the desired information.

2. Hyperglycæmia is met with in many diseases of ductless glands:—

(a) *Thyroid gland*.—Removal of the thyroid gland leads to diminution of blood sugar, and reduces hyperglycæmia, produced by removal of the pancreas. Thyroid feeding in normal animals diminishes tolerance for carbohydrates and blood sugar is raised. The respiratory quotient is raised indicating increased combustion.

Glycosuria is often a symptom of exophthalmic goitre. There is diminished tolerance for carbohydrates in hyperthyroidism, and this is due largely to defective storage mechanism.

In thyroid deficiency sugar tolerance is variable. In cretinism it is increased; in myxedema it may be either increased or diminished, but the renal threshold is generally raised.

(b) *Parathyroids*.—Removal of parathyroids leads to a reduction of sugar tolerance.

(c) *Pituitary body*.—Injection of the active principle of the posterior lobe results in hyperglycæmia; extracts of the anterior lobe have no such effect.

Acromegaly.—In this disease also hyperglycæmia and glycosuria are as a rule developed. In fasting the blood sugar may exceed 0.3 per cent.

Hypopituitarism.—(Frolich's disease).

This condition, as regards blood sugar, resembles hypothyroidism. Increased tolerance for sugar is generally observed.

(d) *Suprarenals*.—Injection of epinephrin leads to a rise in blood sugar. This is due to an increased discharge of glycogen and its conversion into glucose in the liver. Epinephrin is antagonistic in its action to insulin and in hypoglycæmia, after insulin injection, an injection of epinephrin may be given. Speaking generally, hyperactivity of the thyroid, pituitary and adrenals produces hyperglycæmia and a fall in sugar tolerance.

3. *Hyperglycæmia and diminished tolerance for sugar* may be met with in various infective conditions. This is usually of a transitory nature. In anaesthesia with chloroform or ether and in asphyxia there is also a rise of blood sugar. Occasionally in obesity there is diminished tolerance for carbohydrates. In chronic interstitial nephritis, arterio-sclerosis and hyperpiesia, blood sugar may be high, the renal threshold may be raised, and no glycosuria. Attention has also been drawn recently to the fact that in gastrointestinal cancer there is high blood sugar and a prolonged sugar tolerance curve.

4. *Alimentary Hyperglycæmia*.—I wish to draw your attention to this condition, which is of peculiar importance to us, since in our experiments the main point brought out is that there is a marked rise of blood sugar in pure vegetarians after glucose injection, and that this is associated with glycosuria.

The liver plays a part of the first importance in carbohydrate metabolism, but in the production of glycosuria its role is considered of secondary importance. If a person takes excess of carbohydrates in his diet, as most of us do, the glycogenetic function of the liver may be strained too much and a portion of the sugar absorbed from the intestine may pass into systemic blood and thus produce hyperglycæmia and glycosuria. This seems to be the most likely explanation of the frequency of glycosuria in this country. In the early stages there may be no damage to the islets of Langerhans, but merely a deficiency of the storage mechanism. Apart from flooding the liver with products of carbohydrates of the diet, alimentary hyperglycæmia may occur if there is any congenital or acquired defect in the glycogenetic function of the liver.

Such factors, I have no doubt, operate very frequently in this country, where so many diseases occur which throw a strain on the liver. I am sure the frequency of glycosuria in this country is due, to a very large extent, to a rich carbohydrate diet and sedentary habits of life, which impair the glycogenic function of the liver. The activity of the cells of the islets of Langerhans are thus overstrained for a long time. The pancreas eventually breaks down, producing the well marked clinical condition of diabetes mellitus.

The few observations recorded here give strong support to this view. Benedict, Osterberg and Newirth's experiments show that the normal adult human being does not possess a complete tolerance for sugar, and the difference between a normal and diabetic person is purely a quantitative one. We should all do well to follow their advice to observe caution in the use of sugar with our meals.

Certain observations by Macleod show that excess of cane-sugar in the diet may be followed by the absorption of cane-sugar as such in the blood, which may escape storage in the liver, causing the presence of cane-sugar and also invert-sugar in the urine. Alimentary glycosuria is particularly evident when sugar is taken without any other food. He says that cane-sugar was given in an amount corresponding to 5 grms. per kilogram body weight to 17 healthy individuals. In 1½ hours afterwards the urine of 10 of these individuals contained cane-sugar, 3 containing dextrose and lævulose also. It was found that cane-sugar continued to be excreted for about 7 hours. Coelho and I have also noticed that 50 grms. of cane-sugar causes in some cases a higher rise of blood sugar than glucose, but the curves obtained with cane-sugar are not so regular and uniform as with glucose.

The observations recorded here are limited, and further work is necessary to elucidate many problems connected with this complicated subject. I might suggest the following lines on which this work might be carried out:—

1. To make quantitative observations on the diets of vegetarians and non-vegetarians, and to ascertain the incidence of hyperglycæmia and glycosuria in relation to the amount of carbohydrate ingested.

2. To keep a non-vegetarian on a purely vegetarian diet for some time and to ascertain the changes in blood sugar and sugar tolerance that may occur.

3. To ascertain the functional efficiency of the liver in vegetarians and non-vegetarians as to its capacity for glycogen formation.

I believe work on these lines will furnish us with valuable data which may eventually lead to a more hygienic way of regulating our dietary. The moral of it is that we should eat less starch and sugar and take more physical exercise.

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BACTERIOLOGICAL STUDY OF STOOLS OF 746 CLINICAL CHOLERA CASES IN CALCUTTA.

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In 1923, while investigating the origin of cholera epidemics in the Jharia coal-fields, one of us (Maitra, 1925) came across a series of cases which in general symptomatology and clinical features could not be distinguished from cases of true cholera confirmed by laboratory findings. But when the stools of such cases were examined bacteriologically they gave persistently negative results and thus stood in marked contrast to another group of cases investigated in the same field almost about the same time. In the latter group Koch's comma vibrios were found to be the etiological factor and were isolated from all cases without much difficulty.

As all these cases were investigated in most adverse circumstances under field conditions, it was reasonably supposed at the time that the failure to ascertain the etiology might have been due to some fault in technique or in the media employed in the observations.

Subsequently, however, when opportunities were available and literature on the subject was consulted it was found that considerable confusion existed regarding the etiology of cases of clinical cholera. Stanton (1917) working in the Federated Malay States found and described, *Vibrio cholerae*, *B. dysenteriae* Shiga, *B. enteritidis* Gartner, *B. faecalis alkaligenes*, *B. proteus*, etc., in connection with cases of clinical cholera which caused a considerable flutter in official circles and led to the appointment of a Government Commission in the latter part of 1916. Greig (1917) in the course of his continued observations in the Calcutta Medical College Hospital, extending over 4 years, found only

cholera and cholera-like vibrios associated with cases of clinical cholera. Rogers (1921) mentioned among other things that *B. dysenteriae* Shiga could give rise to similar conditions and that the fact could only be ascertained by a careful bacteriological examination of the stools. Sprawson and Mukherjee (1922) investigated a choleroïd epidemic in Lucknow in 1921 and isolated a paratyphoid B-like organism from the stools of about 60 per cent. of cases. This organism when isolated fresh did not, however, agglutinate with the high titre paratyphoid B-serum even in a dilution of 1 in 10. Cunningham (1923) also mentions similar cases in association with Shiga infection.

These findings of previous workers coupled with our own experience in the coal-fields in 1923 made it justifiable to repeat the observations in the Campbell Hospital, Calcutta, where laboratory facilities and abundant materials for study existed side by side.

Our observations were commenced in the beginning of 1924 when suspected cholera cases were just beginning to appear in the city and were carried on to the end of the year. The stools were studied not only culturally for the isolation of specific organisms, but their physical characters and the results of microscopical examination of both stained and unstained preparations for parasitic and tissue elements were recorded at the same time. The technique employed was an immediate and direct plating of the fresh sample collected under our own supervision, followed by a secondary plating after 4 hours of enrichment in peptone medium. For direct plating both McConkey's agar and bile-salt agar were employed. For plating after enrichment bile salt agar alone was used. The latter medium consistently yielded the better and more reliable results in our hands for the cultivation and isolation of cholera and allied vibrios. Suspicious colonies from plates were sub-cultured and tested for identification by various cultural, biochemical and serological methods.

Out of a total of 746 cases examined 597 yielded the following cultural results:—

| | |
|----------------------------------|--------|
| Cholera and allied vibrios | .. 590 |
| Non-lactose-fermenting organisms | .. 4 |
| Short chained streptococci | .. 3 |

In the remaining 149 cases although the cultural results were negative, the results of microscopic examination were significant and interesting. The results are summarised in the following table:—

| Vibrios. | Exudate of Choleraic type. | Exudate of Bacillary Dysentery type. | Entamoeba histolytica. | Charcot Leyden Crystals. | Negative. |
|----------|----------------------------|--------------------------------------|------------------------|--------------------------|-----------|
| 40 | 46 | 4 | 1 | 1 | 57 |

In a previous article (1925) the significance of the histopathological elements of stools in the diagnosis of cholera has been dealt with. It follows therefore that no less than 86 of the cases in the culturally-negative series were due to vibronic infection.

A combined consideration of the cultural and microscopical results therefore shows that of 746 cases of clinical cholera 90 per cent. of the total were caused by *V. cholerae* or allied vibrios. Most of the negative findings were associated with cases where the stools had become faeculent and when the chances of recovering the causal organism had in consequence fallen to a minimum. Even in these cases it is reasonable to conclude that vibrios played the same rôle and in the same proportion as in the positive cases.

As regards the rôle of non-lactose-fermenting organisms of the dysenteric and food-poisoning group in the production of clinical cholera we are quite convinced of their unimportance in the Calcutta series of cases. Although these organisms were seldom cultivated their cultural and serological characters were undefined and variable.

CONCLUSIONS.

1. Ninety per cent. of cases of clinical cholera investigated in Calcutta were associated with vibronic infection as proved by cultural and histopathological findings.

2. Cases of the negative series would have shewn vibrios in the same proportion had it been possible to examine them in time.

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A NEW ORGANIC ANTIMONY COMPOUND FOR THE TREATMENT OF KALA-AZAR.

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THE success of organic compounds of antimony, stibosan and urea-stibamine, in the

treatment of kala-azar makes it probable that manufacturing chemists in the near future will endeavour to produce other similar compounds with equal, if not greater, leishmanicidal properties. The main advantage of these organic compounds over the simpler antimony salt is that as the relative toxicity of the former is very low they can be administered in much larger doses than the latter.

During the last few years I have tested the relative toxicity and curative properties of a number of these compounds. Recently I was approached by a firm of manufacturing chemists, the Union Drug Company, Ltd., Calcutta, who had prepared a new antimony compound and wished me to test it therapeutically.

The Compound.—The compound was supplied to me in sealed ampoules, labelled "Aminostib-urea"; each ampoule contained 0.1, 0.15 or 0.2 grammes. The preparation is in the form of a fine light brown powder which is easily soluble in water forming a brown coloured solution; it is said to be a combination of para-amino-phenylstibinic acid with urea and glucose and to contain 24.8 per cent. metallic antimony.

The Toxicity.—It was not convenient to test the toxicity of this compound very accurately at the time, but before using it therapeutically I made a rough estimate of its toxicity in mice and found that the majority survived an intravenous injection of 225 milligrammes per kilogramme weight of body; the toxicity is therefore in the region of that of the two compounds referred to above.

Treatment of Cases.—Altogether seven cases of kala-azar in the Carmichael Hospital for Tropical Diseases were treated with this compound. The initial dose, except in the first case treated and in the case of the child, was 0.1 gramme; subsequently 0.2 gramme was given. The child received an initial dose of 0.05 gramme and subsequent doses of 0.1 gramme. The injections were given intravenously three times weekly; a 5-per cent. solution in sterilised distilled water was used. Details of the cases and the results of treatment are given in the table below. In every case the diagnosis was confirmed by spleen puncture and in every instance in order to confirm cure either a spleen or liver puncture was performed 10 days after the last injection and the material placed on N.N.N. medium which was kept in the cool incubator for at least 14 days. Cases 1 to 5 had never received any antimony treatment before their course of injections with this compound was begun, case No. 6 had received "80 injections of antimony tartrate and a full course of urea-stibamine" and case No. 7 had received a full course of urea-stibamine and a full course of stibosan. The two relapsed cases had not received any injections within 6 weeks of their admission to hospital and were both running a high remittent type of temperature.

Result of Treatment.—The first six cases were apparently cured but the last case, although

| Case number. | Race or Religion. | Sex. | Age. | Duration of illness prior to treatment, in months. | Weight on admission, in lbs. | Number of injections. | Total amount of compound, in grammes. | Total relative amount of compound in grammes per 100 lbs. weight of patient. | Duration of treatment. | Gain or loss of weight during stay in hospital. | Number of injections prior to cessation of fever. | Duration of fever from commencement of treatment. | Size of spleen below costal margin, in inches. | | Leucocyte count at the end of treatment; number of corpuscles per c. mm. | Notes. |
|--------------|---------------------|------|------|--|------------------------------|-----------------------|---------------------------------------|--|------------------------|---|---|---|--|------------------|--|-----------------|
| | | | | | | | | | | | | | Before treatment. | After treatment. | | |
| 1 | Hindu .. | M. | 30 | 6 | 104 | 13 | 2.45 | 2.35 | Days. 35 | lbs. +4½ | 1 | Days. 1 | 4 | 0 | 6,400 | |
| 2 | Indian Christian .. | F. | 5 | 12 | 28 | 13 | 1.25 | 4.46 | 31 | +6 | 6 | 16 | 4 | P. | 6,200 | |
| 3 | Hindu .. | M. | 8 | 24 | 71½ | 13 | 2.5 | 3.49 | 31 | +15 | 2 | 5 | 4 | P. | 10,000 | |
| 4 | " .. | M. | 27 | 12 | 95½ | 15 | 2.7 | 2.82 | 40 | +12 | 11 | 26 | 3 | P. | 11,875 | |
| 5 | Mohammedan | F. | 40 | 20 | 64½ | 21 | 4.0 | 6.18 | 66 | +19 | Febrile throughout. | | 5 | 2 | 12,000 | |
| 6 | Indian Christian .. | M. | 10 | 18 | 65 | 21 | 3.9 | 6.0 | 59 | +2 | 5 | 11 | 5 | P. | 6,000 | Resistant case. |
| 7 | Hindu .. | F. | 35 | 12 | 88½ | 23 | 4.45 | 5.04 | 56 | +12 | 10 | 26 | 8½ | 4½ | 7,200 | Resistant case. |

P.=palpable, i.e., level with costal margin, but not protruding below it

clinically vastly improved, still showed a Leishmania infection by spleen puncture. No vomiting or other untoward symptoms were noted after the injections. Case No. 5 was febrile throughout the whole course of the treatment but her temperature fell to normal immediately the injections were discontinued. The temperature fell to normal with remarkable rapidity in cases Nos. 1, 3 and, in view of the fact that this was obviously a resistant case, No. 6.

Comment.—It is quite impossible to gauge the relative value of "aminostiburea" in the treatment of kala-azar, on a trial on such a limited number of cases, but it would appear that this compound is in the same class with stibosan, urea-stibamine and certain other organic antimony compounds. It is obviously a compound which is worthy of a more extensive trial.

My thanks are due to the Union Drug Company for a generous supply of "aminostiburea."

SOME NOTES ON LATRINES AND HOOKWORM INCIDENCE ON AN ESTATE, AS DIAGNOSED BY THE CLAYTON-LANE CENTRIFUGE.

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Matale.

THE estate to which the following notes apply is in most respects typical of company-owned estates in the island of Ceylon. It seems probable, therefore, that the publication of figures showing the incidence of ankylostomiasis eight years after the Rockefeller Commission commenced work in the island will be of interest to those working on the disease.

Prior to the commencement of the Commission's campaign the estate, in common with practically every other such, provided no latrine accommodation for its labour force, who resorted for purposes of nature to the area around their lines,

as was only too apparent to the nose when in the vicinity of the latter.

With commencement of work by the Rockefeller Commission the provision of latrines was enforced by law. On the estate in question these were constructed over pits dug in laterite soil to a depth of sixteen feet, their sides being practically vertical and, after the first few feet,—varying with top-soil depth in individual spots,—of a hardness nearly comparable with a chalk pit in England. The buildings themselves were of tarred weather-boarding, with corrugated iron roof, the squatting places being also of board, which was re-tarred at suitably frequent intervals. Each pit served four to six actual squatting places, the two sexes being accommodated on separate sides of a central wall. To each side a cement-floored ablution cubicle, draining into the pit, was provided, and cemented invert drains caught the roof-water and led it away from the pit. The original cost of such a latrine of four places, including digging the pit, averaged about Rs. 250.

On this estate the latrines are all situated on a steeply-sloping hillside, and the pits nowhere struck sub-soil water. They have remained absolutely dry throughout their existence. If such is struck, and the pit contains standing water, *Culex fatigans* will breed freely therein. To this is due the intolerable nuisance found in some of the wetter and more elevated districts of Ceylon, where mosquito nets are now absolutely essential, whereas before the latrine ordinance there was no need for such.

In the process of time, various facts have emerged from experience. The six-place pit is unsuitable. The rate of deposition of faeces has at times exceeded the capacity of bacterial destruction. When this has occurred, the level of the faeces has risen very rapidly, with ensuant bad odours. If a latrine in this state be

temporarily put out of use the level of the deposit will, in a few months, sink by several feet,—but this entails alteration of sanitary arrangements, congestion takes place at the alternative latrines, and soil pollution may commence. This is easily understood when it is remembered that the working coolie has to pass his morning motion in the short space of time after getting up and before proceeding to work, and the latrine capacity on an estate must be capable of accommodating all who need it at that hour of the day. Failure to ensure this will unavoidably result in soil pollution. In practice it has been found that two squatting places for each sex for a set of ten line rooms, (accommodating from twenty to twenty-five persons of over infantile age), is sufficient. One latrine of this size serving twice this number of rooms caused much faecal pollution around the set of lines concerned until it was duplicated.

Lids to the holes in the squatting places, self-closing by gravity, were originally provided. These proved unsatisfactory. The coolie usually fouls the squatting place around the hole, and when the lid falls back on the mess it is in no state to come into contact with the back of the next user. The latter, therefore, either defecates on the lid, or the place remains out of use until cleaned by the sweeper. On this estate each sweeper has charge of about forty line rooms and their sets of latrines, which has been found to be about the maximum task possible with the high standard of sanitation enforced.

The coolie, therefore, usually broke off the wooden attachment to the lid which prevented it passing the vertical, and propped it back. A distressing fatality due to trust in these lids being in place occurred in consequence, a child running into a latrine to look for its mother, but entering the men's side by mistake, having fallen down an uncovered hole. Now that the parents know that no lids to the holes exist, they are naturally careful not to allow infants to toddle round the latrines. The actual holes also are somewhat smaller in later constructions, but as the squatting places in such are of reinforced concrete the extra amount of fouling at the edges of the holes is not of great importance, as deposit can be washed into the pit before use from the chattie every coolie carries on errands of nature. In later constructions also arrangements have been made to admit more light than in the first pattern, in which darkness was aimed at to discourage flies. This point has been found unnecessary. Examination of the surface of the semi-liquid mass of faeces in the pits by means of a torch has at times revealed a crawling mass of larvæ, mainly those of *Chrysomya megacephala* Fb., adults of which have been noticed resting on vegetation around the latrines,* but no fly

nuisance has ever resulted. The explanation would seem to be that the larvæ must find dry loose earth for pupation, and such is not available above the mass on the hard, nearly vertical sides of the pit. The prepupal larvæ therefore, I think, perish. Oviposition must have been by eggs dropped into darkness for several feet. I do not think that any fly would descend into the pit itself, and on various torch examinations I have never noticed adults in the pits.

Naturally the pits must slowly fill up, however efficient bacterial action may be, but out of seven sets erected in 1917-18 it has only been necessary to close two for this reason up to the middle of 1925. One of these was a 6-place set, now replaced by two separate sets of smaller capacity, and the other served twenty rooms as mentioned above. It has also been duplicated. At the moment of writing one more set now requires replacement, the first set of four places serving only ten line rooms to fill up.

It is possible that the periodical rises of level, attributed to over use, are not due to this but to the inhibition of bacterial action by the use of disinfectant. A little of the Cresol compounds used in line sanitation must at times find its way into the pits, but I have never been able to correlate a bacterial upset with the emptying of a quantity of such solution into the affected pit, or the addition by sweepers of unauthorized substances, such as line rubbish containing fermentable vegetable matter, which is said to be a cause of unsatisfactory bacterial action, and I think the original explanation is correct. There is probably a definite ratio between the surface area of a pit and the quantity of faeces that can be successfully dealt with regularly, but I have never attempted to work this out.

Faecal pollution of soil on this estate has been very carefully checked for the last seven years, until now it is ordinarily non-existent. None the less, so ingrained in the Tamil coolie are his filthy habits that the least relaxation of vigilance always results in an outbreak of promiscuous defæcation. Punishment, or the fear of it, alone keeps the latrines in proper use. Such a result can only be achieved on an estate where the labour is under perfect control and is not otherwise discontented. On many estates the latrines exist more to comply with the law than for use.

Turning now to ankylostomiasis itself, the estate in question, in common with most of those in Ceylon, showed an infection rate of 98 per cent. to 99 per cent. by the simple smear method when originally surveyed. Being situate in the district in which the Rockefeller Campaign started operations, the original treatments were given without latrines being installed, and therefore, for at least a year thereafter, re-infection must have occurred copiously. The rainfall on the estate is about 80 inches per annum, most of it in the North-East Monsoon, at which time of year the original treatments were carried out.

*I once watched a *Vespa cincla* preying on them. The flies were motionless with the exhaustion of oviposition and the approach of evening. The wasp caught and ate them one by one, flying to the top of a neighbouring Papaya tree to consume its prey.

Thereafter no routine treatments were made for six years. Bad cases coming from India or other estates were treated soon after arrival by the dispenser, without microscopic diagnosis. In other words, 'bad cases' would mean those showing a noticeable degree of anæmia and œdema,—that is, very bad cases indeed.

The writer brought back with him from leave last year the then newly demonstrated Clayton-Lane centrifuge for ankylostomiasis diagnosis, the first, he believes, to reach the island, and with it a routine examination of every coolie inhabitant of the estate was made. Owing to pressure of other work it was not found possible to carry out the complete Clayton-Lane technique for quantitative results. All that could be done was to take a lump of fæces approximately equal in bulk to 1 c.c. and emulsify it direct in saturated saline, the tube being then filled up till the meniscus stood just above its mouth, the cover slip was applied and the whole centrifuged.

My laboratory boy and a sweeper under the supervision of the estate dispenser formed a gang just sufficient to keep myself at the microscope continuously occupied. The routine of operation was as follows:—

The sweeper opened the sample tins and removed and emulsified the material in about three-quarters of a tube of saline standing each tube as completed in a test tube rack. The dispenser meanwhile moved the opened tin and its labelled lid opposite the corresponding tube in the rack, and filled the latter up to the top. When in the centrifuge bucket he added by a pipette the final amount of saline necessary to touch the cover slip, and applied the same. The laboratory boy worked the centrifuge, carried slides to and from the microscope and washed coverslips. The sweeper washed the centrifuge tubes. Generally four slides, numbered consecutively to agree with holes in the test tube rack, were used. The microscopist quoting the number of the slide under examination, the dispenser identified it with the patient from the label on the tin, and the result was entered. With this staff, doing only qualitative diagnosis, it was found possible to do nearly sixty samples per hour after every one had become used to their duties. Much longer has to be spent on a negative than on a positive slide.

The original treatment by the Rockefeller Commission was made with chenopodium oil,—in the series now under discussion this was used for children, and adults showing ascaris infection, but the chief drug used was carbon tetrachloride. Coolies have no objection to the latter. In fact some negative patients asked for it when those still positive were under re-treatment. It apparently has a somewhat alcoholic effect much appreciated by the coolie. No accidents with it have occurred here. The dosages were indicated by officers of the campaign as usual.

It will be observed that the numbers examined

after the first treatment are less than those of the original examination. This is due to the omission from the former of negatives and those exempted from treatment for the usual conditions. In the fourth examination made a year later every inhabitant of the estate was again tested.

TABLE I.

| DATE. | A. 3rd Apl. 1924. | B. 5th Aug. 1924. | C. 18th Sept. 1924. | D. 11th June 1925. |
|--------------------------|-------------------------|-------------------------|---------------------------|--------------------------|
| No. examined .. | 231 | 187 | 192 | 222 |
| Anky. positive .. | 177 | 130 | 89 | 115 |
| Anky. negative .. | 54 | 57 | 103 | 107 |
| Ascaris .. | 8 | 30 | 41 | 54 |
| Trichuris .. | 3 | 22 | 24 | 42 |
| Per cent. with anky. | 77 | 69 | 46 | 52 |
| Per cent. with ascaris | 3 | 16 | 21 | 24 |
| Per cent. with trichuris | 1 | 12 | 13 | 19 |

- A. No general treatment since 1917.
 B. General treatment on 3rd July 1924.
 C. Re-treatment of cases still positive on 22nd August 1924 and 4th September 1924.
 D. No general treatment during intervening period.

Analysis of Column D.

| | Examined. | Positive. | Negative. | Per cent. positive. | |
|----------------|-----------|-----------|-----------|------------------------|---|
| New coolies .. | 29 | 21 | 8 | 72 | All heavy. |
| Old coolies .. | 193 | 94 | 99 | 49* | 40 per cent. of positives with 1-2 eggs only. |
| | 222 | 115 | 107 | 52 | |

* Increase over column C due to inclusion of exempted coolies.

One very extraordinary point is brought out by the figures given above, viz., that apparently the more treatment that is done, the higher becomes the incidence of ascaris and trichuris. I am quite at a loss to account for this. The rise in the former after the first treatment, from 3 per cent. to 16 per cent. cannot represent fresh infection occurring in the intervening four months. Can it be that treatment irritates the worms into oviposition? Carbon tetrachloride is said to have no effect on ascaris, and it is not known whether the ascaridol fraction of the chenopodium oil was high. In any case, statistically, the position as regards ascaris is worse at the end than at the commencement of treatment. It was obvious also, when doing the actual examinations, that ascariasis is largely a family infection. This must mean food contamination, and it would therefore appear that special attention to mothers of families who show ascariasis should be undertaken.

As in all labour forces there is a constant in and out movement of coolies, though it is smaller in the case of the estate under discussion than in many known to the writer. The figures of the

last examination have therefore been sub-divided to show new and old coolies separately, the latter being those who were present during the treatments of 1924. New coolies, in this instance, have none of them come direct from India, but all from neighbouring estates, and the incidence among these coolies, in spite of the fact that obviously infected cases were treated on arrival, is nearly double that of the old coolies of the estate, while in every case the amount of individual infection appeared higher. It is to be feared, therefore, that on most estates the ankylostomiasis incidence is still in the vicinity of 70 per cent., a fact which reveals how much has yet to be done before this disease is got under control.

TABLE II.

| | SAMOA. | | CEYLON. | |
|----------------------|------------------------|------------------------|------------------------|-------------------------|
| | Infected. Per cent. | Reduction Per cent. | Infected. Per cent. | Reduction. Per cent. |
| Before treatment. | 97 | — | 77 | — |
| After 1st treatment. | 59 | 38 | 69 | 8 |
| After 2nd treatment. | 37 | 22 | 46 | 23 |

Comparing the foregoing table with the figures recently published from Samoa, using the same technique (Hopkins, 1925), we get:

Even allowing that the original reduction in the Ceylon series had been from about 98 per cent., and that, if the first treatment of 1924 had been on virgin ground as in Samoa, the reduction might well have been from that figure down to 69 per cent., we still find that there is less reduction for first treatment in Ceylon than in Samoa. The reductions for the second treatment are practically identical in the two islands, and at the end of it both sets of patients were left with a large amount of residual infection. Probably little of this was economically important to the patients themselves,—and if everywhere proper usage of latrines was in force would have comparatively little importance, but there is no word of the use of latrines in the Samoa paper, and we know that they are very ineffectively used in Ceylon, hence these half-cured cases may not only get more heavily infected themselves, but are still liable to act as disseminators of the disease. The first is likely to be the more important occurrence with many of those treated here, for at the final examination 38 of the 94 positives among the old coolies, or 40 per cent., showed only one or two eggs in the film made from approximately 1 c.c. of stool. These would count as negatives, 'cured,' under any technique less delicate than that of Clayton Lane. This is simple and sure, and even for routine campaign diagnosis an immense improvement on any of the pre-existing ones. I would like however to confirm

Hopkins' remarks about the apparatus. The plating and paint is rapidly and badly attacked by the salt solution, though in my case the aluminium arms have not been affected. The handle also should be of stronger construction for unskilled use. With advantage also the arms might be permanently numbered so as to render tube-tin-slide identification simpler, but these points are all minor blemishes such as invariably show themselves in any new pattern of apparatus, and will doubtless be rectified in later manufacture.

REFERENCE.

Hopkins (1925).—The Clayton Lane Technique used in the field to control Hookworm Treatment. *Trans. Roy. Soc. Trop. Med. Hyg.*, XVIII, 428-431.

A Mirror of Hospital Practice.

AN INTERESTING CASE OF PERINEAL FISTULA.

By B. R. GARG, L.M.P.,
Muzaffarnagar, U. P.

A HINDU male, aged 24, came to me on 24th May, 1925, with a fistula in the perineum just at the root of the scrotum and gave the following history:—

"Since July 1924 I had been passing some discharge from the urethra and feeling burning sensation when passing urine. In November last I had an attack of fever and my urine stopped completely for two days. On the third day I had the present wound through which urine began to dribble and no urine came through the meatus. After two days I began to pass urine through the meatus drop by drop and through this wound as well. Since then my condition is the same."

On questioning whether he ever passed blood from the urethra or whether his stream ever stopped while micturating, he answered in the negative and said that he often passed pus and felt much burning just before passing the urine. (The patient is not an intelligent man at all.)

I thought it to be a case of perineal fistula after stricture of the urethra due to gonorrhoea and decided to scrape the indurated margins of the wound, dilate the urethra and keep a rubber catheter in.

After making necessary arrangements the patient was put under chloroform. I tried a No. 12 rubber catheter and to my surprise it passed into the bladder without any difficulty whatsoever. I then took out the catheter and passed a stone sound and felt a stone. I wanted to remove the stone through the perineal wound but the patient's father did not agree to this.

The indurated margins of the fistula were well scraped and a No. 12 rubber catheter was left in. Daily dressing went on for four days with rapid improvement in the wound. On the 5th day the patient came to me with the complaint that although the catheter was in he could not pass urine. I took the catheter out and found the stone lodged in the urethra about one inch above the meatus. I was able to take out the stone with great difficulty because of its hardness and size and had to slit the meatus. The perineal wound healed up within 10 days of operation and the case was discharged cured. The stone weighed 24 grains.

The interesting points in the case are :—

(1) The stone first descended into the urethra, blocked it completely, caused the fistula and then passed back again into the bladder.

(2) The stone was caught into the eye of the catheter, and the urethra which could not allow it to pass before was so dilated with the catheter that now the stone could pass through it.

(3) The patient being very unintelligent had refused any further operation for the stone ; his luck helped him and cured him.

AN ENLARGED WANDERING SPLEEN MISTAKEN FOR AN OVARIAN TUMOUR. SPLENECTOMY AND RECOVERY.

By J. N. SEN, M.B. (Cal.), M.R.C.S. (Eng.),
L.R.C.P. (Lond.),

*Deputy Chief Medical Officer, Tata Iron and
Steel Co., Jamshedpur.*

RASUN, a Mahomedan woman, aged 28, was admitted into Tata's hospital on 10th January, 1925, for a painful swelling in her abdomen, from which she had been suffering for the last two years.

About two years ago she noticed a lump on the left side of her abdomen which did not cause any pain and was unaccompanied by any fever. The lump gradually became bigger and painful until it attained its present size.

Present Condition.—The patient is thin, ill-nourished and anæmic. The lump occupies the whole of the lower abdomen from 2 in. above the umbilicus down to the pelvis, occupying more of the right side of the abdomen. An ill-defined margin could be felt in the left side of the lump but on the right side it was rounded and no such margin could be detected. Above, it was rounded, and below, it dipped down into the pelvis and its lower end could not be differentiated. The lump was painful and tender on pressure and a distinct thrill could be elicited over the lump. She preferred to lie on her right side as dorsal decubitus and the left lateral position caused her extreme pain.

Menstrual History.—Her menses had been regular and she had no children. She had an abortion a few years previously.

Examination *per vaginam* revealed an os of normal consistency but it was pushed forward. The lump could be felt through both the fornices but more through the right. Rectal examination revealed nothing except that the lump could be felt pressing over the anterior wall of the rectum.

Heart and Lungs.—Heart sounds were normal but were quick. Occasional râles audible on both sides of the chest, and breath sounds were slightly deficient at the base of the back of the right lung.

The liver was not enlarged and the spleen could not be felt.

The temperature on admission was 100.2°F. It ranged between 99°F. and 100°F. from the time of her admission, i.e., from 10th January, 1925, to 22nd January, 1925, after which it was either normal or subnormal.

Blood Count.—Unfortunately a detailed blood count which was made on 11th January, 1925, could not be traced but it revealed an anæmia of pernicious type, the colour index being above 1. No malarial parasites were found. The blood picture also showed megaloblasts, normoblasts and poikilocytosis. The history sheet says that no nucleated red cells could be found on 26th January, 1925.

Treatment.—She was put on increasing doses of arsenic and at the end of a month and a half she made good progress both as regards the anæmia and her general condition which improved considerably; the lump in the abdomen showed no difference in size but all pain from it was gone. The thrill which was easily obtained at first was not so marked now.

It was suggested to her that she should have the lump removed as it was thought to be an ovarian tumour. She agreed to this.

Operation.—On 2nd March, 1925, a median subumbilical incision was made under chloroform anæsthesia. The abdomen was opened and a dark-coloured swelling with numerous adhesions was found occupying the subumbilical and pelvic regions. The colour of the tumour was against ovarian tumour which is generally of a dark greeny-blue hue.

The adhesions both intestinal and omental were either wiped off or ligated and cut through. One of these latter adhesions consisted of two big omental vessels which were found implanted on the tumour. Of this more later on.

Dr. Chakravarti, Chief Medical Officer, who was present at the time suggested that the tumour might be the spleen. He was found to be right, as on tracing the tumour I found that it had a long pedicle emerging from under the left costal arch. The pedicle which did not impart any pulsation to the palpating fingers was clamped and cut through. The tumour could then be shelled out quite easily as the adhesions were dealt with

before. It was found to be an enlarged spleen with a long pedicle twisted on itself. The abdomen was closed in layers and the patient put back to bed. She made an uninterrupted recovery, though she gave me a few anxious hours after the operation. The spleen weighed 4 lbs. 12 ozs.

Remarks.—The patient's condition on admission and after examination of her blood was diagnosed as pernicious anæmia, though she improved under increasing doses of Fowler's solution it was thought to be only a remission of the disease which would again flare up probably to end fatally. As she improved considerably both in her blood picture and in her general condition it was thought to be the best opportunity for removal of the tumour which was tentatively diagnosed as ovarian tumour. On opening the abdomen the tumour was found to be an enlarged wandering spleen twisted on its long pedicle. The two big blood-vessels from the omentum implanted on the tumour, as mentioned before, were feeding the starving spleen. The thrill which was quite distinct at the time of admission and which became indistinct later on was probably due to sudden distension and over-filling with blood of the venous sinuses in the spleen due to sudden occlusion of the blood-vessels of the spleen brought on by the twisting of its lengthened pedicle. The constant pain over the tumour which she complained of at the time of admission was probably due to stretching of the capsule of the spleen due to sudden enlargement of the organ. The pain in the left lateral position was probably due to falling of the spleen on that side with consequent dragging of the adhesions. The woman was last seen about a month ago, i.e., 4 months after operation, quite healthy. She has gained in weight and is going about her ordinary work.

My thanks are due to Drs. P. N. Sen and S. N. Sen for compiling these notes for me and to Dr. J. C. Roy who did the blood examination.

A UNIQUE CASE OF MULTIPLE NEURO-FIBROMATA.

By Mrs. E. BERNARD CARR,

Senior Medical Officer, Women and Children's Hospital, Vannarpet, Tinnevely District.

THE patient, a woman, 40 years of age, from Srivaikuntam, in the Tinnevely District, was admitted on 13th May, 1925, with diffuse neuro-fibromatosis. She had numerous fibrous growths of the skin (spherical in shape) all over the body, varying in size from a pea to an olive, but what is of interest is that one of these growths on the right breast grew so rapidly that the breast became elephantoid in size and it was for this that she sought treatment.

She gave the history of having had these growths from early childhood, and that they grew in number and size as she grew older. She had three children, the last one was born 11 years

ago. It is only 2 years since that the breast began to hypertrophy.



The nipple was 10½ inches from the chest attachment. When not supported, the breast reached down to the knee.



The breast was amputated on 16th May, 1925, by Captain V. Mahadevan, District Medical Officer, Tinnevely, and the wound healed in 10 days.

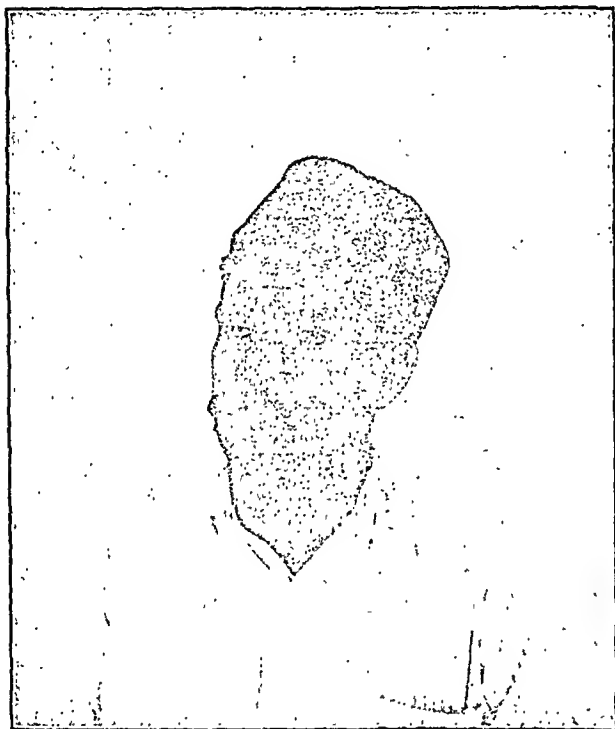
The weight of the tumour after removal was 3½ lbs.

MULTIPLE SOFT FIBROMATA OF THE FACE.

By GANAPATI PANJA, M.B.,

Assistant Professor of Bacteriology, School of Tropical Medicine and Hygiene, Calcutta.

MAHAMMAD ISMAIL, Mahomedan male, aged 26, motor-driver, of light-black complexion and of excellent health, residing at 11, Baker's Lane, Calcutta, came for treatment for nodular lesions on his face which first started on his nose; duration 6 years; (*vide photo.*)



At first sight the disease looked like leprosy. There were nodules on the nose, eyebrows, chin and lobes of the ears, the nose being most affected and disfigured. Besides nodules there were also scars on the nose.

The nodules were soft, pinkish, and varied in size from a mustard seed to a pea; some were pedunculated and looked like papillomatous growths. The nodules on the nose joined with one another and gave rise to a diffuse corrugated swelling.

There were no subjective symptoms. The patient did not give any history of any family predisposition to the disease and denied syphilis and gonorrhoea.

On examination of a smear from a cut nodule no acid-fast bacilli were seen; mononuclear leucocytes and a few yeast-like organisms were found.

One nodule was cut aseptically and a culture was made on blood and ordinary agar slopes from the cut surface; only diphtheroid colonies were visible after 48 hours. A microscopic section of the nodule showed the following:—Papillæ flattened; a layer of loose cellular tissue present

beneath the epidermis; no signs of malignancy; corium mainly showing fibrous tissue with young fibroblasts; and no acid-fast bacilli seen.

Major G. Shanks, I.M.S., Professor of Pathology, Calcutta Medical College, also examined the sections and gave a diagnosis of soft fibroma.

About a week after another nodule was cut aseptically and a culture taken; again the diphtheroids were obtained, so an autogenous vaccine was prepared.

The patient had had 17 injections of salts of margosoic acid before he came to me and said that he had slightly improved, but that he did not wish to continue them as they had not been very efficacious.

I gave him Mist. pot. iodide, grs. 10 to 1 oz., for a week and then increasing the dose to grs. 15 asked him to continue another week, but found no appreciable improvement. Locally only ung. borovaseline was prescribed.

I then began injecting him with the autogenous vaccine, beginning with 10 mils. Ten injections have been given, the last one being 100 mils. The nodules have diminished in size but the improvement is not very satisfactory; the patient is highly satisfied and insists on the injections.

The disease is evidently a multiple soft fibroma of the face of unknown origin. It is not leprosy, although clinically it appears like leprosy. Can this be due to *B. diphtheriae*?

The patient is still undergoing treatment.

A SIMPLE CURE FOR LEUCODERMA.

By P. BHASKARA RAU, L.M.P.,

Medical Officer, Local Fund Hospital, Narasapatam, Vizagapatam District.

DURING April 1924, I developed a leucodermic patch on my chin, slightly to the right side. It started as a small white area about the size of a split pea and rapidly grew to the size of an eight anna piece. There was slight itching at the beginning. About 15 days later a second patch appeared on the ventral aspect of the left forearm, six inches above the wrist joint, and rapidly grew to the size of the patch on the chin. About a week afterwards I noticed a big patch on the whole of the inner aspect of the pinna of the left ear.

I showed it to many distinguished medical friends who all diagnosed it as leucoderma. I was advised to try Hormotone tablets (G. W. Carnick Co.) and various other tonics internally and tincture of iodine, tinct. ferri perchloride, all the mercurial ointments singly and in combination, iodised phenol,—in short everything that has even a faint action on parasites of the skin—externally. At this stage, i.e., after three months of unsuccessful trial of all the above medicines, as a last resource I showed it to my friend, Dr. C. Mallik, L.R.C.P. & S. (Edin.), L.F.P.S. (Glas.), of Vizagapatam, who kindly gave me the following Ayurvedic recipe:—

| | | |
|--------------------------------------|----|----------|
| Yellow orpiment | .. | 1 part. |
| Seeds of <i>Psoralea corylifolia</i> | .. | 4 parts. |

Both the above to be mixed and finely powdered. To the powder add a sufficient quantity of fresh cow's urine to make a thick paste and apply externally, frequently.

I was frankly sceptical about the result, but the cure was speedy and sure. In a fortnight all the three patches completely disappeared, and though it is nearly a year now since I used this treatment I have not noticed these patches again.

Both the drugs are to be had in every bazar in India. The seeds are called *Bavanchi ginjalu*, *Kralugechha vittulu*, *Karubogi vittulu*, and *Kala ginjalu* in Telugu and *bhavanchi*, *vakuchi*, *soma-rajee*, *Somavalli suvalli*, *avalunga*, *Krishna phala*, *Puti phala*, *Chandra-rekha*, *soma*, and lastly *kushtughna* (a very suggestive name) in Sanskrit.

Ayurvedic physicians recommend that the juice of the seeds be given internally for a lot of other diseases, but I have no experience about its action.

Before concluding I wish to add that any pure drinking water appears to be as useful as cow's urine, in the treatment of this condition. The total cost of the treatment is only half an anna.

[Note.—*Psoralia corylifolia* is better-known as *Bouchi* seed. It is well known as a "remedy" for leucoderma. It has been used in the treatment of this condition for some years at the School of Tropical Medicine, Calcutta. It has beneficial results in certain types of leucoderma.

We think with the writer that pure drinking water is probably as useful as cow's urine, even when the latter is available. Editor.—I.M.G.]

AN UNUSUAL CASE OF MALARIA.

By NISANATH GHOSH, M.D. (Cal.),
Civil Assistant Surgeon, Assam.

In 1922, while I was at Kohima, the following case of malaria came to my notice:—

S. L., Hindu male, aged 30, a 'Naik' of the Assam Rifles, was brought to hospital on 5th October, 1922, at midday in an unconscious condition. He had complained of headache and malaise that morning and dropped down unconscious about an hour before admission.

Condition on admission.—The patient was lying flat on his back, unconscious, and he did not respond either to a call or touch. His eyes were closed; pupils contracted, equal, and sluggishly responsive to light; conjunctivæ responsive to touch. Respiration was deep and stertorous at times, 16 per minute; pulse somewhat quick and soft, 88 per minute; temperature 97°F. There was nothing abnormal about his heart, lungs and bowels; the spleen and liver were not enlarged, and he was passing urine involuntarily at times. A catheter specimen of the urine showed no trace of albumin, sugar, diacetic acid, acetone or tube-casts. The odour of his breath and the condition of his eyes, ears, nostrils and mouth supplied no clue to the cause of his comatose condition. The knee-jerks were exaggerated; Babinski's sign absent, and Kernig's sign present.

The patient had four convulsive seizures on the left side of the body at irregular intervals.

Kohima was a very malarious (mostly M. T. infections) place at that time, so peripheral blood films of all febrile and doubtful cases were examined for malarial parasites. This was done in this case and about 2 to 4 malignant tertian rings were detected in almost every red blood corpuscle, so a diagnosis of malignant tertian malaria was made.

Treatment and Progress.—Quinine bihydrochlorid grs. viii in 10 c.c. intravenously, and $\frac{1}{2}$ c.c. pituitrin subcutaneously (to counteract the fall of blood pressure) were administered at 4 P.M. on the day of admission. Next morning the temperature rose to 103°F. but the patient regained consciousness and the convulsions ceased. Intravenous quinine in the same dose was continued for six days altogether. The temperature dropped to normal on the third day and recovery was uneventful.

From 11th October, 1922, quinine, grs. x.b.d., was given by mouth and on 14th October, 1922, when the parasites had disappeared from the peripheral blood the patient was discharged from hospital.

NOTEWORTHY POINTS.

1. Sudden onset with unconsciousness and convulsions.
2. Absence of fever and no enlargement of the spleen at the onset,—especially the former.
3. Rise of temperature but recovery of consciousness after first dose of intravenous quinine.
4. Presence of fever for one day only.
5. Presence of parasites in peripheral blood films even after 8 days' administration of quinine (including intravenous quinine for 6 days at grs. viii per day).

PNEUMONIA AND CELLULITIS TREATED WITH INTRAVENOUS IODINE.

By S. N. DATTA, L.M.P.,

Titabar Tea Co., Ltd., Titabar P. O., Assam.

I HAVE had the opportunity of treating some cases with intravenous injections of tincture of iodine and have had very satisfactory results.

The first was an adult female with the typical signs and symptoms of lobar pneumonia affecting both lungs. I applied anti-phlogistine to the chest, gave 1/30th gr. of strychnine sulphate hypodermically every two hours, an alkaline mixture with digitalis four hourly and 5 grs. of quinine sulphate in solution twice daily. The patient was put on a fluid diet and given brandy occasionally. In spite of eight days of this vigorous treatment I could detect no signs of improvement, so determined to give intravenous iodine a trial. So in addition I gave tincture of iodine in $\frac{1}{2}$ c.c. doses with 5 c.c. of distilled water on

alternate days intravenously. After two such injections the dose of iodine was gradually increased by 3 or 4 minims to 1 c.c., as also was the amount of diluting water until its maximum of 10 c.c. was reached. Immediately after each injection she had a slight rigor when she was given hot tea or milk to drink. The day after the third injection there was marked improvement and after the 5th or last injection an uneventful convalescence set in. She was discharged from hospital after about three weeks.

The second case was a coolie woman, aged about 30, who was admitted to hospital with severe spreading inflammation of the right leg with threatening gangrene and well marked pyrexia which resulted from a small perforating wound acquired while manuring tea bushes a few days before. I made several free incisions but despite these measures the patient's condition remained the same, in fact the ulcers formed by the incisions tended to slough. Then I put her on intravenous iodine as above and from the second injection the improvement was pronounced. After four or five injections she made a satisfactory recovery.

In four or five other septic cases I tried intravenous iodine with uniform success.

It would be interesting if other readers of this journal who have tried this simple remedy in similar cases were to record their findings.

NOTES ON CASES OF ACUTE YELLOW ATROPHY OF THE LIVER.

By Y. S. ROW, I.M.P.,
Alipuram Jail Hospital, Bellary.

Case 1.—The patient, a Moplah, aged 25 years, was admitted into hospital on 17th February, 1925, with a history of severe vomiting and jaundice. He was talking well at the time of admission. In the night at about 10 P.M., i.e., about 14 hours after admission, he became restless in bed and very irritable; tried to get up from bed and did not answer any questions. It was with the greatest difficulty that he was kept down in bed. His pulse was very slow, 58 per minute. As he did not pass urine after noon, it was drawn through a soft catheter. The urine was very dark coloured and contained bile; there was neither blood nor hæmoglobin. Next day there was slight rise of temperature to 100°F.; pulse became rapid. The liver dullness was greatly diminished. Leucin and tyrosin were present in the urine. The patient was still in the same unconscious state from which he did not recover. He died on 19th February, 1925.

A post-mortem examination was conducted and the following signs were noted:—

All the abdominal organs were deeply stained with bile. Small patches of hæmorrhage were present over the outer surface of the large intestine. The liver was very small, flabby and greenish-yellow in colour, and weighed 30 ozs. There were also small hæmorrhages in the substance of the liver. The organs of the thorax were normal except for being bile-stained. The meninges of the brain were highly congested and there were also minute hæmorrhages in the substance of the brain.

The case was diagnosed as acute yellow atrophy of the liver, by our medical officer, Dr. V. J. Lopez, I.M.D., and to confirm the diagnosis, a portion of the liver was sent to the Professor of Pathology, Madras, who confirmed the diagnosis.

Case 2.—The patient, a Moplah, aged 35 years, had been in previous good health. He gave a history of slight fever and jaundice since 1st April, 1925. His bowels were constipated. On 6th April, 1925 his temperature was 102.4°F.; pulse rapid and 120 per minute. He had severe vomiting. Convulsions soon set in on the same day. Later on he became unconscious, passing into a deep coma. The liver dullness was greatly diminished; urine was highly coloured and bile-stained. There was congestion of the bases of both lungs. The patient did not recover consciousness and died on 7th April, 1925.

Post-Mortem Signs.—All the internal organs were deeply bile-stained. Small hæmorrhagic patches were present over different parts of the small and large intestines. The liver was small, soft, flaccid and dark-yellow in colour with lighter yellow nodules in its substance and weighed 34 ozs. There was slight consolidation of the bases of both lungs.

The case was diagnosed as acute yellow atrophy of the liver, by our medical officer, and a section of the liver was sent to the Professor of Pathology, Madras, who confirmed the above diagnosis.

The above two cases occurred within a period of two months of each other. On referring to the old case sheets, I found another case which occurred in July 1923, which though diagnosed as acute toxic jaundice was most probably another case of the above disease. The notes are given below.

Case 3.—The patient, aged 25, was admitted into hospital on the evening of 17th July, 1923, with a temperature of 101.8°F. with a little abdominal pain, the latter of 4 days' duration. The bowels were constipated and there was tympanites present. The blood examination was negative to malaria. He developed severe jaundice the next day, became restless and unconscious, and the pulse was rapid. Urine was greenish-yellow; retention of urine was present. He did not recover from

the unconscious state and died on 18th July, 1923.

Post-Mortem Signs.—Both lungs were congested. The thymus gland was enlarged. The abdomen contained 1½ pints of yellow bile-stained fluid. The liver weighed 26 ozs., was studded with small nodules of yellow colour, and on section was very tough. The intervening substance between the nodules had no appearance of a normal liver. There was slight congestion of the cæcum. A Meckel's diverticulum was present about 2 feet from the cæcum and presented neither congestion nor strangulation. The brain was highly congested.

Unfortunately the liver was not sent for pathological diagnosis. From the similarity of signs and symptoms of the last case with the above two cases, this might also have been another case of acute yellow atrophy of the liver.

These are the only three cases that occurred since the opening of this jail in October 1921, till the time of writing this note. There does not seem to be any special reason for the occurrence of the above disease which is a very rare one.

I am very grateful to our medical officer, Dr. V. J. Lopez, I.M.D., for his kind permission to publish the above notes.

THE UP-GOING TOE.

By CAPTAIN M. S. H. MODY, M.B., B.S. (Bom.), M.R.C.S. (Eng.), L.R.C.P. (Lond.), D.T.M. & H. (Lond.),

Physician to the Out-patient Department,
Sassoon Hospital, Poona.

IN their most interesting and instructive contribution on "The Babinski or Extensor Form of Plantar Response in Toxic States, apart from Organic Disease of the Pyramidal Tract System," appearing in the *Lancet* of 10th January, 1925, Elliot and Walshe make an appeal to examine this question of an up-going toe in the various toxic comas. They word it ".....but the accumulation of evidence from one hospital is slow. This preliminary paper is therefore written in the hope that other physicians may be inclined to examine the question in the various toxic states that chance to come under their observation, and that so a body of information may be collected from which it will be possible to deduce the general principles that govern the form of the Babinski reflex".

My plea for these few lines is the following case:—

A young Mohamedan boy, 18 years of age, was brought to the out-patient department in a stuporose condition; there was extreme restlessness (suggesting toxic influence on the brain); pupils dilated and reacting to

light; severe jaundice; yellow discoloration of the conjunctivæ but not of the skin; temperature 101°F.; pulse 95; liver not felt; spleen not enlarged; knee jerks++; ankle jerks++; ankle clonus+; and extensor response of the plantar reflex on both sides.

The history being that a fortnight ago he had an attack of jaundice ushered in by fever with rigors, the fever lasting for two days followed by vomiting, and the typhoidal state had set in only two days before he was brought to hospital. He died the same night, the temperature before death being 107°F. with a pulse rate of 148 and respirations of 60. Unfortunately a post-mortem was not performed, and in the absence of our knowledge of the liver condition, the surmise is that it may have been *cholæmia*, setting in as a fatal complication of catarrhal jaundice, or it may have been acute yellow atrophy of the liver.

In *cholæmia* there is liver destruction with a comatose condition from toxic influence on the brain, leading to extreme restlessness, coma, and a double extensor response.

SYPHILITIC DYSPNŒA SIMULATING AN ASTHMATIC FIT.

By M. G. RAMACHANDRA ROW, M.B., C.M.,

Chief Medical Officer, Town Hospital,
Pudukkottai, Trichinopoly.

A WELL-NOURISHED male, aged about 42, of good position, complained of cough and slight tickling sensation in the throat. On examination I found there was slight congestion of the throat and a few râles over the chest, here and there.

Two days later the irritating sensation in the throat increased and the cough got worse and he developed dyspnœa simulating an asthmatic attack. There was slight rise of temperature ranging between 99°F. and 100.4°F. and severe dyspnœa with typical cooing rhonchi and râles all over the chest.

Cardiac and renal asthma were eliminated after careful examination of the heart and urine, and the case was treated as one of bronchial asthma. The patient was put on the usual asthmatic mixture and in addition he had injections of adrenalin chloride solution, 10 minims on two occasions, and injections of morphia sulph. ¼ gr., atropine sulphate 1-150th gr. on 8 different occasions. Each injection gave him relief for about 4 to 5 hours, but the symptoms appeared again with doubled force.

After a week's treatment when I saw that there was no relief and the patient was getting worse, the idea that the patient was syphilitic struck me and I immediately started on anti-syphilitic treatment.

I injected sulfarsenol three times at intervals of 5 days, intramuscularly as he refused to take intravenous injections. After the third injection the dyspnoea disappeared like magic and the patient gradually picked up from that date. He is now perfectly all right. This case is sent for publication, as practitioners are likely to miss syphilis as a cause of dyspnoea and it should also be taken into account in all cases of asthmatic fit.

If this were a pure and simple case of bronchial asthma, one or two injections of adrenalin chloride and the usual stock mixture would have been likely to tide over the attack and give permanent relief, but in this case the dyspnoea lasted for fully 23 days, except for a few hours when he had either the adrenalin or the morphia and atropine injection.

A CASE OF MALARIAL PROSTATITIS WITH REFLEX RETENTION OF URINE.

By CAPTAIN S. L. CHOPRA, M.B., B.S.,
Dera Ismail Khan.

SEPOY YADAR, aged 20 years, strong and healthy, of the Frontier Constabulary, Daraban, was admitted into the Civil Hospital, Dera Ismail Khan on the 6th May, 1925, for retention of urine, fever and headache.

Family and previous histories were of no importance. He gave no history of gonorrhoea.

On 2nd May, 1925, he developed headache and fever at Darazinda post and next morning had retention of urine, which was relieved by a warm sitz bath. He had retention again in the evening and was evacuated to Daraban, where he remained for three days, during which time he was relieved by catheterisation. Fever and headache continued, the temperature being remittent. He was evacuated to Dera Ismail Khan.

On examination he had a palpable spleen, furred tongue and a full bladder, containing sixteen ounces of urine (removed by catheter) which was normal. On rectal examination the prostate was slightly but distinctly enlarged and extremely tender. He had severe headache and temperature 100°F. No mechanical or nervous cause to explain the retention of urine could be traced nor were there shreds in his urine by the two-glass test. The blood was examined and he had a heavy infection of sub-tertian malarial rings. He was put on acid-cinchona mixture with arsenic; the next morning the fever and headache had both vanished. Patient passed urine himself and rectal examination on 8th May, 1925, revealed that the enlargement and tenderness of the prostate had altogether disappeared. He was kept on cinchona and graduated doses of arsenic and had no recurrence of the trouble. He left hospital cured on 25th May, 1925.

This case would strongly suggest that the malignant tertian parasite, which is well known to possess the property of accumulating in the cerebral and intestinal vessels, can do so—as would seem in this case in the prostate, and is a striking illustration of the wisdom of the instruction:—"Examine the blood in all cases of fever".

I am indebted to Major J. B. Hance, F.R.C.S.E., I.M.S., Civil Surgeon, Dera Ismail Khan, for permission to publish the case.

A CASE OF RESUSCITATION AFTER CESSATION OF THE VITAL FUNCTIONS FOR OVER 15 MINUTES.

By N. C. KAPUR, B.A., L.R.C.P. (Lond.), M.R.C.S. (Eng.)

MAJOR, I.M.S.,

Resident Physician, Medical College Hospital, Calcutta.

A HINDU male, R. C., aged 80 years, was brought to the Medical College Hospital at 10 P.M. on the 13th of July, 1925, suffering from severe dyspnoea—the result of laryngeal obstruction due to a malignant growth of the larynx. As his case was urgent, he was taken straight to the operating theatre for the performance of tracheotomy. When the patient was placed on the table, he suddenly stopped breathing. On examination, the heart sounds were found absent, the pupils were dilated and the eyes were fixed. Artificial respiration was immediately started and tracheotomy was performed when the patient was apparently dead. The patient's chest was continuously flicked with a cold wet towel. For fully 15 minutes there was no response. There was complete cessation of breathing, heart sounds were absent, there was no pulse at the wrist, and the patient's face had the usual cadaveric characters. Just when all hope seemed to have been lost, the patient's chest was flicked in a forcible manner and, to the surprise of everybody present, the patient took a shallow breath. The flicking was continued and after a minute the patient took another breath. The pulse was now perceptible at the wrist and the heart sounds could just be heard. The respiration gradually established itself. The patient has been doing well since except that he is suffering from a malignant growth.

I am publishing this case as, although I have had several cases of laryngeal diphtheria where there has been a complete cessation of breathing and heart's action for 5 to 7 minutes and the patients have been resuscitated, I have not had a case of inspiratory dyspnoea where a patient has been revived after a complete cessation of vital functions for over 15 minutes.

The case is published by the kind permission of Lieutenant-Colonel F. P. Connor, D.S.O., F.R.C.S. (Eng.), I.M.S. My thanks are also due to Assistant Surgeon Provash Chandra Banerji, the Officer on Duty, Medical College Hospital, who helped me in the operation, and who patiently and

continuously carried out the most tiring duties of artificial respiration for more than half an hour.

A CASE OF BULLET WOUND OF THE CHEST FOLLOWED BY PLEURISY WITH EFFUSION.

By RAM LABHAYA, L.M.S.,

Assistant Surgeon, Civil Hospital, Pind Dadan Khan.

MUSSAMAT KARAM BHARI, aged 35, of the village Wabula, was shot by a pistol on the night of 19th June, 1925. She was brought to the Civil Hospital, Pind Dadan Khan by the police on 20th June, 1925, for examination and treatment. There was a bullet wound $\frac{3}{4}$ in. by $\frac{1}{4}$ in. going through the chest wall on the right side of the chest, $2\frac{1}{2}$ in. below and to the inner side of the right nipple. Blood was coming out of the wound. There was no exit wound, but on the back in the middle line a hard mass feeling like a bullet was felt under the skin, a little higher in level than the wound in front. Her pulse was 94 per minute, respiration 56 p.m., and temperature 100.4°F .

Her condition began to improve in hospital and on 29th June, 1925, when the wound in the chest had nearly healed, after incision on the back the bullet was removed and the wound stitched. One end of the bullet was bent, which might have been due to its striking against the vertebrae.

By 7th July, 1925, the wound on the back had healed but she was getting slight fever— 100° to 101°F .—and the respiration was hurried. Dulness on percussion and fulness of the interspaces on the right side of the chest developed, so the chest was aspirated on 16th July, 1925, and 26 ozs. of bloody fluid was withdrawn.

There was some improvement, but fluid filled in again so she was again aspirated on 27th July, 1925, and 32 ozs. of bloody fluid was again withdrawn. After this her temperature and respiration rate came to normal and she was discharged cured on 18th August, 1925.

The case is of interest because after a bullet wound which had gone right through the chest the woman recovered. Throughout her illness there was no cough, which meant that the lung had not been injured.

AN INTERESTING CASE OF TRANSVERSE PRESENTATION.

By MADAN H. JHAVERI, M.B., B.S. (Bom.),
*Medical Officer, Loinwe, Kengtung Subdivision,
Southern Shan States.*

The patient was a primipara, 16 years of age, of short stature and quite healthy. She was seen and examined by the Sub-Assistant Surgeon, Kengtung, on 8th June, 1925, who found the foetus was in the normal second position—9 months and 7 days old (according to the patient). The pelvis was slightly contracted.

On 14th June, 1925, she was brought to the hospital at about 11 p.m. When examined by the Sub-Assistant Surgeon he found that the foetus had turned its position, i.e., now the foetus

was in the first transverse position. He could only elicit from the patient that the pains had begun during the day and the uterus was massaged from time to time by the patient and her friends. When she was admitted the pains were irregular. He tried his best to correct the position by both versions but he could not succeed. He sent for me in the middle of the night. I reached Kengtung in two hours and a half—a distance of 17 miles. When I examined the patient the foetus was in the first transverse position and the uterus was regularly and continuously contracting. The only course left open was to extract the foetus in the breech position. The patient was put under chloroform; the cervix was fully dilated. The hand was passed under the foetus and the nearest leg, that is the right, was searched for. Both the legs had become extended but they were brought out safely. The hands were then brought out. The after-coming head gave difficulty owing to the contracted pelvis but it was brought out safely by Smyly's method. The placenta came out without any trouble. The child when weighed was $8\frac{1}{2}$ lbs. and was well developed.

The patient was febrile, the highest temperature being 101°F . on the sixth day, although all aseptic precautions were taken. She was given the usual quinine and ergot mixture and hot vaginal douches, and for three days tinct. iodine (5 minims) was injected intravenously. The patient is doing well and at the time of writing the temperature was normal.

The question arises as to whether it is possible that after the foetus was in normal position at full term, the position could be changed even after undue manipulation by the patient. Up to the present I have managed six cases of transverse presentations at Bombay and at Bassein, but in no case was the foetus at full term.

INTRA-MUSCULAR INJECTION OF UREA STIBAMINE.

By S. KUNDU,

Assistant Surgeon on Kala-azar duty, Sylhet.

Just after returning from Shillong and taking charge of my present duties in Sylhet. I was repeatedly asked by my Sub-Assistant Surgeons who are treating kala-azar cases whether urea stibamine can also be safely used intramuscularly, especially in children when the veins are too fine to be easily punctured. In order to satisfy their curiosity in this point, I should like to publish the following note which may help them in some way in undertaking the intramuscular use of urea stibamine.

In six of my cases where a little solution had escaped into the subcutaneous tissues at the time of intravenous injection, three had much pain in the site, swelling and induration and three had actually abscesses requiring opening. In two cases where deep intramuscular injections were given in gluteal region only pain was complained of for 2 days but no induration at all.

In spite of this experience in the intramuscular use of urea stibamine, I had occasion to treat a case, in a child of our own family, which requires publication as of some interest to the medical profession. This is the only solitary case, in our family, who lived in Barisal town since his birth and none had any occasion to mix with the kala-azar cases anywhere except myself, as my duty keeps me constantly exposed to kala-azar infection. The child had no occasion to live with me in Assam before he was actually sick.

The child, aged $1\frac{1}{2}$ years, was found to be suffering from suspected fever for 6 months and was taken to me for treatment through my advice. Past history shows continued type of fever for $1\frac{1}{2}$ months in the beginning and later irregular fever. Present condition gives—spleen up to umbilicus, liver 2 fingers below costal margin, anaemia and oedema most marked; leucocytes counting below 2,000, dysentery severe and temperature running 103 to 104. Diagnosis of kala-azar was made by finding Leishman-Donovan bodies in the peripheral blood and positive aldehyde test. Urea stibamine was started by intramuscular injection, veins being too thin for the needle. Ten injections were given in the doses of—

| | | |
|---------|-------------------|-------------------------|
| .01 gm. | in 1 | c.c. of distilled water |
| .02 | do. | do. |
| .04 | in $1\frac{1}{2}$ | do. |
| .06 | do. | do. |
| .06 | do. | do. |
| .06 | do. | do. |
| .08 | in 2 | do. |
| .08 | do. | do. |
| .08 | do. | do. |

every third day, representing a total of 0.65 gm. of urea stibamine and nothing was complained of except on the last injection. With these injections the patient was progressing well, temperature became normal on the fifth injection, spleen diminished, oedema completely disappeared, general constitution wonderfully changed and weight much gained. Intramuscular injections were given two in deltoid, six in gluteal, and two in thigh muscle and the result was very satisfactory on the whole, but on the tenth injection the child got very high temperature which continued for 3 days accompanied by much pain and swelling at the site of the last injection which was in the thigh. Intramuscular injection was stopped and, with the stoppage of fever, his general condition gradually improved and after a fortnight he appeared to be cured. Veins being prominent at this stage, 4 more intravenous injections (not intramuscular) in the doses of .05, .08, .1 gm. in 2 per cent. solution were given without any trouble with a view to prevent relapse, as spleen puncture could not be taken to know the sterility. The child is now quite healthy. It is a year since the child was treated by urea stibamine.

From this it appears that urea stibamine is not a very irritant drug like antimony tartrate, though

a little local irritation may be noticed in some when used intramuscularly or subcutaneously. In any case intravenous injection is the most suitable and popular method as this does not cause any irritation or pain at the site of injection, if given properly, but if intramuscular use is to be made, a great deal of precaution about the sterilisation of skin, syringe and solution is absolutely necessary. Any defect in these is sufficient to cause irritation in the site when used intramuscularly.

A CASE OF PERNICIOUS MALARIA TREATED WITH QUININE INTRAVENOUSLY.

By KHAGENDRA NATH CHATTERJI, M.B.,
Chinsurah.

ON 1st September, 1925, I was called in to see a young boy who became collapsed after violent vomiting and purging which followed an attack of fever. It was the fifth day of the attack, the fever used to come every day with shivering and was followed by diarrhoea and vomiting. On the third day the boy passed hæmorrhagic stools and became pulseless. His pulse was however restored by the injection of pituitrin by a local doctor, and the hæmorrhage from the bowels also stopped, but on the fifth day, the collapse was severe; the extremities, especially the upper, were cold and shrivelled, both pulses were almost imperceptible, the temperature was subnormal, there was agonising pain near the umbilicus and liver area accompanied with persistent bilious vomiting and purging. The stools resembled very much those of dysentery. The patient was restless and sighing in respiration. I took the history, and was told, that shortly after the boy had come back from Jessore, where he stayed a week, he had intermittent fever, which was usually followed by diarrhoea and vomiting. From the above symptoms and the history, I thought it might be a case of a bad type of pernicious malaria and this was confirmed when I found the spleen was much enlarged. I thereupon decided to adopt a method of treatment which would bring about the most prompt and sure effect, and I gave the patient quinine bihydrochloride 5 grs. intravenously, diluted with 20 c.c. of normal saline, with 10 minims of adrenalin chloride sol. added to it. This brought immediate relief with cessation of all the symptoms. The patient becoming quiet, I left him with instructions for a rectal saline to be given. When I left, I saw the patient was getting a reactionary rigor which was not severe. In the evening when I went to visit the patient again, I found him much better; his pulse had returned, his extremities were warm, and there was no more purging nor vomiting. The next morning I gave the patient quinine 5 grs. intravenously diluted with 10 c.c. of normal saline, and another on the following day. The boy is keeping well since then.

Indian Medical Gazette.

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THE ANCIENT SYSTEMS OF MEDICINE.

MORE than three years ago the Government of Bengal appointed two Committees to report what steps could be taken for the restoration of the Ayurvedic and Tibbi systems of treatment, with special reference to the question of teaching these systems.

It is understood that these Committees have made their report to Government, but a recent resolution on the report of the Tibbi Committee indicates that the Bengal Government is conscious of the difficulties and drawbacks which would attend any attempt to maintain side by side, several rival systems of medicine. Many educated Indians believe that it is desirable to revive the ancient systems of medicine, and in some provinces action has already been taken to give practical effect to this view. It is necessary for practitioners of scientific medicine to study the question and to instruct public opinion on the results which would be likely to follow from the official recognition of a number of systems of medical practice.

To begin with, we must have clear ideas of the question of systems in general. In former times medicine was mixed up with religion and just as there were religious dogmas so there were medical or medico-religious dogmas which were based on the undisputed authority of accepted teachers. Even when the close connection between medicine and religion was broken in Western countries there were still systems based on certain preconceived ideas and war was waged between homœopathy and allopathy. Homœopathy taught that small doses of drugs were effective remedies for diseases in which the symptoms were similar to those caused by large doses of the drugs in question. Allopathy taught that when a certain symptom occurred in a disease the best treatment consisted in giving large doses of a drug which produced the opposite symptoms. It cannot be too widely known that modern scientific medicine does not accept either of these views, but concerns itself with the discovery of the causes of disease, with the removal of these causes and with the discovery of the best available remedies for the diseases. Allopathy is dead, and it is merely because the allopathists took most kindly to scientific methods and discarded their allegiance to preconceived notions that the name of allopath is still wrongly applied to the medical scientist.

Medical men who believe in science should indignantly repudiate the designation of "allo-

paths," they should make it clear that they stand for knowledge from whatever source it is derived. Homœopaths are now following in the same direction and need only drop the old name and the adhesion to the exploded basis of homœopathy to become eligible for admission into the brotherhood of medical science. Homœopaths rendered a considerable service to humanity in the past, the infinitesimal doses of medicines which were employed by them gave a chance to the great healing power of nature, at a time when the allopaths were poisoning their patients by large doses of harmful drugs. We must admit that some of the practitioners of our own times have not yet completely freed themselves from the evils of the system of allopathy. We cannot at once undo the harm that is caused by wrong traditions, but all who believe in science will press forward towards the truth, and we can safely claim that the spirit of modern scientific medicine is a humble search for more knowledge. We recognise the existence of only one true system of medicine, scientific medicine—based on observation and experience. Having looked to our own foundations and satisfied ourselves that they are sound, we must try to educate the public and get rid of the mistaken idea that we form one of several warring systems which are appealing for popular support.

We must also make it quite clear that we are prepared to look for and receive help from every source. We do not admit that there are Ayurvedic or Unani drugs which we refuse to adopt merely because they have not been generally used in modern medicine. Never has there been so ardent a search for better remedies, and if we can find a drug which is better than the one which we now employ, we insist on the right to use it from whatever source it may come. Suppose, for example, that practitioners of one of the indigenous systems were in the habit of using a drug which has a definitely curative action in diabetes, it would at once command a huge sale at enormous prices and when we hear of some obscure and struggling quack who says that he knows of such a drug his position is like that of a poor man who has a secret method of converting brass into gold and yet is living in abject poverty. From time to time we do hear of these wonderful remedies, and more or less hopefully put them to the test, but only to be disappointed by finding that they are useless.

Compare the advances which have been made by scientists in the discovery of new and potent remedies like the salvarsan group with those which have resulted from rummaging among the heaps of vaunted ancient drugs. It is not really surprising that the old drugs should yield such poor results; our present supply of remedies consists chiefly of substances which have been found by centuries of empirical use to have a certain value, and the reason why so many have been discarded is that they have not stood the test of observation and experience. In spite of this we

still continue the search, and we still hope that some drugs may have been discarded undeservedly, but we cannot be blamed if we press forward most especially with investigations of a type that has in the past yielded the more fruitful results. Medical scientists deny that they have their hands tied by any prejudices against remedies merely because they are not orthodox, they deny that there is any really useful form of knowledge which they refuse to adopt.

What then is the reason for the attempt to revive the ancient systems? Let us look at some of the reasons which have been brought forward by the advocates of such a course. It is claimed that scientific medicine has failed to meet the needs of the masses in India and that a cheaper system which uses less costly drugs will succeed where science has failed. But there is no evidence that science has failed, though the application of science may have been defective. Quinine has failed to make any serious impression on the malaria of India, this is not surprising when we consider the quantity of quinine that is available in our dispensaries, it is ludicrous to expect that three or four grains of quinine will produce any impression on a person suffering from malaria. The alternative is to employ some cheap drug which can be used freely, but when we come to ask which drug should be used, we find that there is not a particle of evidence that any cheap indigenous drug has the slightest effect on the malaria parasite. Much the same thing applies to all the remedies which have been proved to be curative in the other great diseases of India, and no government would dare to offer the people inert drugs, even if they cost nothing at all.

We might just as well offer the people straw and dust as articles of diet in times of scarcity, as offer them useless medicines when they suffer from malaria and dysentery. If cheap remedies are available to the practitioners of the ancient systems it is our business to find them out and to take them into use. To institute a farcical system of distribution of useless remedies would make any government which adopted it the laughing stock of the world. If cheap and potent drugs exist they are capable of being used by our existing practitioners whose training will enable them to judge of the efficacy of such drugs.

Another suggestion is that our modern methods of standardising drugs makes them too expensive, and therefore we are advised to resort to ancient methods of preparation. Can any one with scientific training countenance such a procedure? In the case of harmless and simple remedies standardisation is hardly needed, but then such drugs are of little value in the treatment of diseases which kill and maim.

Then it is argued that our courses of medical education are too costly, and the suggestion is that followers of the ancient systems can be trained on far cheaper lines for supplying medical relief to the masses.

If such practitioners are entrusted only with the harmless drugs, they need no training at all, but when it is a question of employing potent remedies we cannot readily adopt the suggestion of entrusting these to persons who are ignorant of their properties or of the methods of diagnosis of the diseases for which they are employed.

Efficiency in the diagnosis of disease and in the use of the remedies is absolutely essential, if we admit of a sacrifice of efficiency the sooner we cease to offer medical relief to the people the better. We do not find an outcry because our doctors are too efficient, quite the reverse, and those who have most closely studied the question maintain that our policy must be directed towards increasing efficiency and the employment of more scientific methods rather than towards a relapse to barbarism.

The railway train is horribly expensive, the bullock cart is cheap and simple, but we do not hear of any demand for the construction by Government of bullock carts instead of costly steam engines. The truth is that expensive and scientific appliances, in the long run, are by far the cheapest and therefore they have supplanted the old and wasteful methods of pre-scientific days. There is still a need for bullock carts in spite of the network of railways, but there is no need for a state organisation for the supply of these simple needs. In the same way there will for generations be a need and a demand for simple domestic remedies, but this need can easily be supplied by the people themselves; Government can only be expected to step in to provide the more expensive requirements which need a highly specialised organisation for their application.

Another point is that there are thousands of practitioners of the indigenous systems who could be made far more efficient if only they received a special training in modern scientific methods. But we have no evidence that they will accept this training, they certainly have made no demand for it and they are not likely to do so. The indigenous systems claim that they are perfect and complete, if their followers were to sit at the feet of scientific teachers this claim would have to be withdrawn and it is hard to imagine that the Ayurvedic or Unani practitioners would be so lacking in astuteness as to admit their inferiority in any respect.

It is an alluring prospect to imagine the indigenous practitioners being weaned away from the error of their ways by contact with scientists, but an insuperable obstacle lies in their over-weening confidence in their own superiority. Some of them, it is true, are painfully aware that the public is finding out the weakness of their claims, and they have a secret desire to learn some of the methods which are bringing such credit to medical scientists, but it is impossible to conceive of any cheap course of instruction which would

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render the indigenous practitioners capable of handling the two-edged swords which medical men have learned to wield by years of patient study.

If we are to have a cheaper and more humble class of practitioners let us train them from the beginning, rather than attempt to eradicate the firmly rooted preconceived ideas of the followers of the systems. There are plenty of young men of intelligence and education who are only too willing to take up the medical career, the only difficulty lies in deciding whether it is possible or wise to adopt a shorter and cheaper course of training for medical men.

Another argument with which we are faced is that the ancient systems are natural to India and popular, and that the people are prejudiced against scientific medicine. The best reply to this argument is to visit one of the kala-azar dispensaries where we see the people crowding eagerly to receive intravenous injections. We hear far too much of the rooted prejudices of the Indian peasant; the truth is that when he has seen the value of any new method, whether in agriculture or medicine, he seizes on it just as eagerly as the most advanced European.

It is not so long ago since no orthodox Hindu would touch a dead body, yet our medical colleges and schools now have ten applicants for every available seat in their class rooms.

The advocates of the restoration of the ancient systems admit that the present practice of these systems has become debased, but they think that by search among the ancient writings the methods of their balmy days can be discovered and their ancient glories restored. Even if we were to admit that in the good old days the Ayurvedic system was complete and had perfect systems of surgery, midwifery and hygiene, this admission would not alter the present state of affairs, it would make us willing to take up the study of the old books and if a claim were made for funds for this purpose nobody would object. We might feel doubtful as to the ultimate value of the work, but when Universities spend large sums of money on pure and unproductive learning there can be no possible objection to their taking up so interesting a study as that of the ancient medical systems of India. It is strange that such bodies as the Calcutta University have not already done more in this direction. The systems as we know them at the present day are rich in claims, but more than claims are needed.

It would be just as reasonable to institute schools of training in alchemy and astrology with a tincture of chemistry and astronomy as to establish mongrel schools in which the ancient systems would be taught side by side with scientific medicine.

In either case the civilised world would first of all be astounded, but soon it would be dissolved in laughter at so incongruous a spectacle. India is rightly pressing her claims for admission

to the commonwealth of advanced and civilised peoples, her claims will not be advanced by a deliberate return to obsolete systems. It is even urged that properly trained practitioners of the ancient systems should be registered and recognised equally with western practitioners. Once this claim is admitted there must be equality of treatment, so that at each head-quarters station there will be an Ayurvedic Civil Surgeon, a Tibbī Civil Surgeon and a Homœopath each provided with a suitable hospital and dispensary. For a poor country a four-fold establishment of this kind will be a severe tax and the situation will be ludicrous: better far to decide which system is to be employed and refuse state aid to the others. We have not yet heard of any serious demand for the abolition of the existing medical officers, but if the state recognition of the ancient systems is carried to its logical conclusion this will have to be the next step, as we cannot afford to employ equal numbers of practitioners of all the systems in every place. The Madras Committee on the Ayurvedic system expressed the view "that there can be but really one system of medicine of which the existing systems are but parts" and "we would like to see the future practitioners in India, no matter what denomination they belong to, being so trained as to bring to the problem of ill health, not only the expert knowledge of their own system, but as far as practicable, the best that is in the other systems also."

This view really expresses the aim of scientific medicine which is striving to attain to perfection of knowledge, from whatever source it may be attained, but scientific medicine admits that it has still a long way to travel, while the other systems claim that they have already reached the goal. Nobody is so unteachable as the person who believes himself to know everything, and unless the practitioners of the systems "become as children" like the followers of science there can be little hope of their adopting this excellent ideal.

Should the practitioners of the systems become converted to this view, they would have to set their faces in the same direction as the scientific practitioners, and they would quickly find that they were travelling on the same road. As matters stand they are not likely to adopt this course, they would be compelled to give up their cherished belief in their own superiority and perfection, they would have to discard the comforting doctrine of self-sufficiency and would be compelled to gird up their loins for a long and toilsome journey.

It is not that we refuse to lend a helping hand to our brothers who belong to the ancient systems, far from it, but can those who admit their imperfection offer to teach those who claim to be perfect? Under the circumstances we prefer to live and we are sure that we shall best be able to maintain the amicable relations which exist

between ourselves and the practitioners of the indigenous systems if we follow our own path and allow them to do the same. If there be any widespread demand for the restoration of the ancient systems the first step must be made by the adherents of the systems, they must produce evidence that they can supply a public need which cannot be supplied by the existing scheme, but they are in the dilemma of knowing that if they can demonstrate the superiority of any of their methods as compared with the methods of scientific medicine, we shall, without hesitation, adopt the improvement which they have brought to our notice. To do so is in the interests of humanity and is perfectly fair; we have published every detail of our knowledge to the world, so is it not only right that the treasures of the ancient systems should also be published for the use of humanity?

It may be suggested that we are prejudiced, our interests are at stake so that we cannot be accepted as reliable witnesses in this matter. If this argument is raised we must appeal to the opinion of the whole civilised world, this has already been expressed in favour of scientific medicine, so that if we ask for a verdict from educated humanity they would be faced by the hard fact that it is a case of the whole world against the systems. European practitioners have discarded their own ancient system in spite of centuries of hallowed tradition, they cannot be accused of blind prejudice when they equally discard the systems which have been given up by the whole mass of educated opinion in India.

Let the practitioners of the systems place their cards on the table as we have done, let them admit that existing knowledge is far from perfect and that science has yielded up secrets of the greatest importance, let them join us in the search for truth and knowledge, and in the application of that knowledge and we shall receive them with open arms. Under existing conditions fellowship with them in medical practice is inconceivable.

It is surprising to find that the advocates of the restoration of the systems include a small number of intelligent Indian medical men who profess the firmest belief in modern medicine. It is hard to believe that they can be actuated by any motives other than expediency. There has been a good deal of loose thinking on the subject of the indigenous systems; it is time that we came down to hard facts.

To them we would like to put two questions: "Do you believe that there are drugs or methods of treatment, used exclusively by the practitioners of the ancient systems, which are superior to those used in modern scientific medicine?"

We should expect their reply to be in the affirmative; their attitude would otherwise be inexplicable. Our second question would be: "Can you suggest any reason why those superior drugs or methods should not be adopted by practitioners of modern scientific medicine?"

J. W. D. M.

SPECIAL ARTICLE.

A CRITICAL REVIEW OF DR. C. A. BENTLEY'S "MALARIA AND IRRIGATION IN BENGAL."*

By C. STRICKLAND, M.A., B.Ch.,

Professor of Medical Entomology, School of Tropical Medicine and Hygiene, Calcutta.

THE purport of Dr. Bentley's work is the submission to Government of his opinion as to the causes of the malaria which afflicts the province of Bengal and to suggest a scheme for the amelioration of its condition.

The distinction of the author, the high place which he holds in the administration of Government and the magnitude of the issue, will ensure that what he says will receive most careful attention, and there is therefore no reason to apologise for the scrutiny of the paper which is here made in the hope that it may be helpful to those who wish to come to a right decision in the matter. All the more so as one of the theses submitted by the author is, as will be seen later, the basis of statements by laymen and politicians which have been used publicly as a rod wherewithal to beat the "Satanic Government."

Now that being the purport of the work, the title would suggest that the author has found the decline of agriculture to be the exciting cause of the trouble, but as one reads through the pages one finds that such has not been the case. The following passages show it, ".....the great increase of malaria disease..... is inextricably bound up with a coincident decline of agriculture owing to.....and....." (*vide* p. 65).

"The common origin of these associated evils is to be sought in....." (*ibid*). "The evidence incriminating.....as the cause of both agricultural decline and increase of malaria is so overwhelming that....." (p. 67). "A greatly increased prevalence of the disease almost invariably accompanies the decay of agriculture" (p. 1) "..... has caused serious damage alike to agriculture and the health of the people." These and many other statements of a like nature indicate that the author had no intention of incriminating the condition of agriculture with the incidence of malaria, but that both conditions are the result of some other factor. That being so, such references to agriculture, which take up a large proportion of the work, appear to be irrelevant to the discussion and to have no more justification or value than would have a coincident analysis of the growth of anarchical societies in the community or of any other consequences springing from the same root.

Now the author in analysing his data predicates that deltaic tracts are not prone to malaria, e.g., those of the Nile, the Mekong, the great rivers of China and many others. Some however are so, as the Mississippi and the Gangetic plain. Why should some be malarial and not others? One possible reason is not mentioned by the author, viz., that one locality may support a mosquito fauna different from another. *Anopheles ludlowi* for instance is found in Malayan deltas but not in Indo-China. Such an instance shews that deductions made concerning one country are absolutely of no value in another.

It is the ubiquitous embankment of the Bengal delta that Dr. Bentley blames for the woeful condition of the province to-day. He would premise that any locality which has not been embanked, if any such exist, is perfectly healthy because it is subject to the normal flood and flush of river inundations and it is only the works of man that have

* "Malaria and Agriculture in Bengal. How to reduce Malaria in Bengal by Irrigation." By Charles A. Bentley. Director of Public Health, Bengal. Calcutta: Bengal Secretariat Book Depôt, 1925. Price, Indian Rs. 2-2; English 4s.

Note.—The italics all through this paper are the reviewer's.

made it unhealthy. Thus, "there has been a great extension of malaria.....since the construction of several hundred miles of railway." "The indiscriminate embanking of vast tracts primarily for flood prevention and for the construction of the network of railways and roads that now covers the country, has caused serious damage.....to the health of the people." Then (p. 21 *et seq.*) he gives correlated statistics of the malaria and the mileage of embankments in the four great divisions of the province to support his hypothesis. He also cites (p. 34 *et seq.*) several instances where the construction of embankments for public works has been accompanied by epidemics; and another piece of evidence, culled from Stewart and Proctor, is that certain *thanas* in Murshidabad District outside the protection of an embankment have a lower spleen index than others inside it.

More generally, the author says that the deltaic area is potentially malarious if the rivers are disorganised by human interference, which usually lies in the form of works for improved communications or zemindary* bunding; and that there is reason to believe that many of the changes in the Bengal rivers during the last sixty years have followed the embankment of the country. He is clearly of the opinion then that embankments are the exciting cause of the trouble.

Dr. Bentley explains why embankments should have led to an increase of malaria. They have prevented the normal flood and flush of the land; no silt-bearing water has deposited its burden to level up the inequalities of the surface which are so favourable to mosquito-breeding, and the reduction of lineage of dangerous "edge" in the breeding places has not ensued. Further, he says, river inundation water seems *per se* to be inimical to anophelines, while rain-water is favourable.

Now, in reading the author's evidence in favour of his hypothesis, one is struck by one very salient fact. Although Eastern Bengal may not be so well provided with roads and railways as the other divisions, yet it has 163 miles per 1,000 square miles of area; moreover what it lacks compared to the other divisions in roads and railways probably owing to the land lying lower and more subject to inundation, it makes up with a greater number of zemindary bunds. Yet in spite of this degree of embankment the health is notoriously good. Dr. Bentley himself refers to it in these sentences "the delta tracts at present largely exempt from the disease," and "the future welfare of the country depends on its continued good health."

Then again, although Northern and Western Bengal have about the same mileage of rail and road embankments (about 300 per 1,000 sq. miles) yet Northern Bengal is very much more healthy, its increase of population in 1901-1911 being as 8.0 per cent. to 2.8 per cent. in Western Bengal.

If one then turns to the data afforded by the separate districts in any one Division there is the very important fact noted by Fry that Howrah District and the southern part of Hooghly District are strikingly non-malarious as compared with the adjoining Burdwan District, yet those districts are perhaps more embanked than any in the province.

Finally, if one turns† with the author to other countries and Lower Egypt be compared with the Presidency Division of Bengal, both are of about the same area; Lower Egypt has 3,600 miles of embanked roads and rails, and is, practically speaking, non-malarious, while the Presidency Division with about 4,000 of embanked works is very malarious.

It is justifiable then to conclude that notwithstanding the evidence cited to the contrary embankments *per se* are not dangerous, or at any rate not to any "economic" extent. Indeed, Dr. Bentley himself in one passage says that that is so, that they are only dangerous when the embanked land is not irrigated, and that irrigation schemes should always

include the embanking of rivers and improved means of communication. In this one sentence the author himself refutes the unqualified assertions of paragraph after paragraph and chapter after chapter.

Now if embanking the delta is not to be blamed for the state of affairs, can any alternative hypothesis be submitted? The reviewer reiterates that if there were not an embankment in Bengal except such as be naturally thrown up by the rivers the distribution of malaria would be precisely as it now is; and that the explanation lies in the existence of local variations in the natural physiography of the delta. One need not go into any detail concerning the structure of a delta—which has been fascinatingly portrayed by Ferguson (1912)—suffice it that the varying elements in the picture can be considered to be responsible for all that has been observed in the local incidence of the disease. Thus the great ill health of the Western Districts as compared to the Eastern may be due to the fact that the Western side of the delta has been raised and the rivers, having thus done their duty, have migrated to the East, leaving the "decayed" channels behind; these provide no flood or flush and that has brought malaria. Whether the land has been embanked or not has made no difference. Dr. Bentley himself in one passage says that in these decayed tracts the old river-beds become but local storm water chutes and that this decay of the river systems "has been responsible."

To summarise then up to this point, Dr. Bentley would explain the malaria in Bengal as due primarily to the embanking of the land, which prevents the natural flood and flush by river inundations. The reviewer, on the other hand, suggests that whether or not there be an embankment in the province, the incidence of malaria would to-day be as it is and that this is wholly a function of the existing state of growth of the different parts of the delta.

The second part of the author's paper is devoted to the schemes which he advocates for the amelioration of the state of affairs. They are classified according to whether they have any coincident economic value or not. The former are called, after the Italian, "bonification" The others are the "specific" anti-malarial measures.

The specific anti-malarial measures are in general dismissed as impracticable on the score of expense or that they have been tried and failed. If they were to be carried out on the same scale as at Panama they would cost from 18 to 27 crores per annum. Drainage schemes, he says, are in general out of the question as in the flood season the level of the rivers is too high. Flooding without aiming at any economic advantage (therefore not 'bonifying') has been successful in a few places. The information given regarding the administration of "State quinine" is very valuable and should, it seems, be reprinted for the benefit of all governments who make use of it.

The author says that all these measures are so comparatively inefficient or costly that they should only be tried to allay malaria in a lightly-infected community, when they might be partially effective.

The measures called "bonification" imply a much more fundamental policy and are needed in a highly infected decadent community. The particular measure of bonification indicated for Bengal is irrigation.

Examples are cited where attempts at bonification have been successful in other countries, particularly in Holland, the English Fens, and the Italian Val da Chiana; in Egypt irrigation should not strictly be described under bonification for it was not instituted for the purpose of allaying malaria. But as pointed out above malaria is so local in the mechanism of its incidence that the experience of one country is by no means repeated in another, nor even in the same, for some of the Italian schemes have failed.

Coming nearer home, however, the Tanjore (Cauvery), Godaveri and Kistna delta irrigation schemes covering in all some 4,000 square miles of Madras Province, are recounted as examples of what has been done by irrigation (*plus* embankment). The

* Zemindar = landlord.

† Although, as shewn above, one should not do this.

results have certainly in every way been magnificent. In Bengal itself several comparatively minor schemes have been instituted: some have been in some degree successful, e.g., the Dankuni Jelah Project and the Howrah and Rajapur schemes; others have failed, e.g., the Manikhali Khal and Magraghat drainage. The Bengal schemes were mostly put in hand for only drainage purposes but in practice the drainage outlets have been used as irrigation inlets, so that the schemes come properly under the heading of irrigation.

Apparently the author thinks that irrigation schemes for the afflicted tracts of the country will neutralise all the harm that embankments have done in preventing flood and flush, but in addition he favours the statutory prohibition of further embanking. He, moreover, considers that these schemes would have a desirable effect in the direction of improving the navigability of the rivers and so making the need for roads and railways less clamant.

Now before embarking on great irrigation schemes primarily with a view to reducing malaria, the evidence adduced by the author which bears on the problem must, as he will allow, be specially considered. In the first place, presuming such schemes to be technically practicable,* is it likely that they will be successful? Most of the irrigation schemes which have been tried certainly suggest that such would not make matters worse than they now are, even if they would not improve the situation. Projects on a big scale, however, like those in the Madras Province deltas might succeed where smaller ones have failed. On the other hand, if the malarious parts of the province are malarious only because they have been elevated, then whether watered with rain-water or irrigation water they might be equally unhealthy. It is a most striking fact that *A. aconitus*, one of the worst of malaria carriers, delights in the fast-flowing water of grass-edged irrigating channels (see plate 1), and in the Brahmaputra delta it is in the irri-



gating channels of the land above the *pathar* level that one chiefly finds *A. funestus* (\approx *minimus*). Moreover, irrigation water does not carry the silt which Dr. Bentley says is such an important factor. The situation might, it appears to the reviewer, be exactly comparable to what one sees in that very district of Assam where Dr. Bent-

* The laymen in these matters may be permitted to ask whether the amount of water available for irrigating—*qua* flooding-and-flushing in the more elevated malarious parts of the delta will be sufficient for the purpose without so reducing that which now provides the flood and flush of the more fortunate parts that the condition of these will be rendered similar to that of the raised area. Indeed, Dr. Bentley himself says “more water might be temporarily diverted down a moribund water-way, but this result can only be obtained at the expense of other channels and may therefore do as much harm as good.”

ley was medical officer; the non-malarious “*pathar* level” subject to inundations from the Brahmaputra, and the elevated “red-bank” alluvium (see plate 2), very



malarious, where the rice-fields are intersected with little irrigation channels teeming with *A. funestus*.

Such facts are warnings that Dr. Bentley's conclusions, based mainly on the theoretical assumption that “flood and flush” is necessary to prevent malaria, may, if put into practice by irrigation not have any result. There is need for caution. Nevertheless, an irrigation scheme must necessarily have an economic value, so that not much would be lost if it failed from a health point of view. And the proceeds might, following the very good Italian custom, be earmarked for later and better anti-malarial schemes. The reviewer on this account would beg to support Dr. Bentley's proposals to Government.

On the other hand, the possibilities of drainage schemes might be reconsidered, though the reviewer admits that *a priori* not much can be hoped from them because the worse malaria carriers, like *A. funestus*, are more at home in drains than in the pools and swamps which they drain. Most of the so-called drainage schemes which have been instituted in the past have worked out as irrigation *plus* drainage schemes. The Saraswati scheme, however, was successful (see p. 118)? There should at any rate be no difficulty about providing for gravity drainage in the more malarious parts of the delta, as they are the highest parts and the old river-beds and river-bhils are at the highest points of them.

Needless to say there is very much more, which is very valuable, in the author's paper than has been touched upon in this review, but the essential points have been carefully considered. The arguments submitted against the acceptance of some of the author's conclusions as to the causes of malaria in the Province suggest the advisability of proceeding with proper caution, but have not traversed the main object of the work,—the recommendation to Government that the irrigation of the malarious tracts should be taken in hand.

Dr. Bentley's work is testimony to his Napoleonic vision and Government should be grateful to him for his spirit. No such gigantic piece of sanitary philosophy has ever before been perpetrated. The author would make a gargantuan feast of Gorgases.

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Current Topics.

"Unani" System of Medicine. Official Decision.

From *The Statesman*.

A RESOLUTION of the Government of Bengal on the report of the Committee appointed in August 1921 to consider and advise the Government as to the best steps to be taken for the restoration and development of the *Tibbi* or *Unani* system of medicine states that the Governor in Council, after a careful study of the Committee's report, is of opinion that there is not adequate justification for the expenditure of public funds on the scheme outlined by the Committee.

The Committee issued a *questionnaire* to 272 *hakims* of standing in different provinces and to members of the All-India *Tibbi* Conference but the response was disappointing. Later, it was decided to depute Major Suhrawardy and Hakim Habibur Rahman (members of the Committee) to visit different centres of *Tibbi* learning with a view to studying at first hand the method of teaching in vogue in different *Tibbi* schools. In his report Major Suhrawardy pointed out that the *Tibbi* or *Unani* system had languished in Bengal, partly owing to the decline of Moslem influence. It was suggested that the encouragement of the *Tibbi* system might provide a cheap and yet sufficiently skilful type of doctor for the needs of the Mohammedan community in rural areas and might provide employment for many of the Maulvis who, after a course of study at the Madrasahs, have difficulty in finding a market for their wares.

The Committee then made certain proposals which briefly stated, are as follows:—

(1) The establishment of *Tibbi* schools in Bengal to be associated for clinical training with the recognized Government medical schools of the province; (2) the provision of scholarships for the purpose of sending selected students to the *Tibbi* colleges at Delhi and Lucknow, these scholars being bound by agreement to enter a rural medical service or to practice in rural areas with the help of subsidies to be granted by local bodies, on the completion of their course; and (3) arrangements for post-graduate training of students qualified in the *Tibbi* system, under well-known *hakims* in different parts of India.

DEFECTS OF PROPOSALS.

The chief defects of these proposals, the resolution points out, is that they are designed to produce a class of practitioners following a system of medicine which admittedly requires to be supplemented by a study of such vital subjects as midwifery, gynaecology, surgery, bacteriology and the whole science of preventive medicine. The proposals, moreover, aim at giving a mere smattering of the Western system to students who in educational qualifications are much inferior to the type of students now seeking admission to the recognized medical schools. The Government have deliberately set themselves to promote the spread of Western medical science, and have taken steps to control and standardize the training and examination of medical students in Bengal. Many private schools, which had neither the means nor facilities to train and qualify students for general medical practice, have been closed, and a high standard is gradually being built up. It would not be possible to introduce *Tibbi* students into the recognized medical schools for clinical training and the Governor in Council is of opinion that any definite recognition by the Government, such as the Committee proposes, of *Tibbi* studies will inevitably drive the Government ultimately into accepting full responsibility (involving heavy expenditure) for the continuance and development of a system which is in so many respects utterly different

from the system already transplanted with such admirable success into India.

The Government are not satisfied that there is any need to subsidize *Tibbi* studies proper, or that there is justification for the state incurring expenditure in seeking to engraft some limited knowledge of Western methods and theory on to the *Tibbi* system. And the lack of response by the general public and by *Tibbi* practitioners to the inquiries of the Committee suggests that there is no strong popular demand for an attempt to multiply the followers of Avicenna.

X-Ray Photographs sent by Wire.

QUICK *x-ray* diagnosis by eminent specialists have been made possible by telephoning *x-ray* photographs. A negative showing the bone structure of the human hand was sent from New York to Chicago in seven minutes on Wednesday, April 15th, 1925. Details were not lost in the procedure, and an accurate examination of the film was possible.

The time element in the diagnosis of an injury or ailment by a specialist is most important. In complicated fractures or other bone injuries, a quick diagnosis is invariably desirable in order to prevent infection or other complications. A saving of hours or days means everything to the patient.

During the recent tornado in the middle west, a woman received a severe fracture of the knee. The medical men available, who were not *x-ray* specialists, were unable to treat her, and it was necessary to take her to New York. If an *x-ray* film could have been sent by wire, a specialist would have been able to reply immediately with instructions for preventing permanent lameness or other complications without the necessity of going to New York. The possibility of sending the negatives by wire brings the specialist to the small community.



Fig. 1 is a reproduction of the original *x-ray* negative of the hand, sent from the laboratories of the General Electric Co. Inc. of Schenectady, New York, U. S. A.



Fig. 2 is a reproduction taken from a photograph of a positive, printed from the untouched negative as received by wire by the Victor X-Ray Corporation, Chicago.

Stibenyl in Malaria.

By Prof. Dr. TEWFIK SALIM.

(*Archiv für Schiffs- und Tropen-Hygiene*, 1925, Band 29, pp. 183-186.)

"ALTHOUGH we have in quinine a very active specific against malaria, the question of the treatment of this fertile disease has not unfortunately been definitely solved. Under the action of quinine the non-sexual forms of the parasite disappear in most cases, rapidly and with certainty and the chief symptoms of the disease, such as fever, anemia, enlargement of the spleen and so on. But it is unfortunately far from a *therapia sterilisans magna*; in most cases it is incapable of bringing about especially in the tropics, the disappearance of the sexual forms. The sick, in spite of a careful treatment with quinine, shelters in his body the dormant germs of infection for the transmission of the disease to healthy men. The finding of a medium which can kill gametes with certainty is of the greatest importance for the treatment of malaria. Our investigations with salvarsan and neo-salvarsan alone or with combined quinine, as also with newer bismuth preparations and yatren, carried out by my assistants Dr. Essad and Dr. Ekrem have failed to give encouraging results. The successful use of newer preparations of antimony in various tropical diseases has induced us to try them also in malaria. We have used Stibenyl in three cases of malignant tertian with quinine and obtained a quick disappearance of malignant tertian gametes from the blood."

Mahatma Gandhi and Ayurveda.

(*Indian Medical Record*, August 1925.)

IN view of the special attention the subject is receiving in this number we quote here the whole of Mr. Gandhi's reply to Kaviraj Gananath Sen's pro-

test, as it appeared in our contemporary some months ago. Kaviraj Gananath Sen had written:—

I take this opportunity of drawing your attention to the fact that the speech you delivered when laying the foundation stone of the Ashtanga Ayurveda Vidyalaya has been greatly misconstrued both by the public and by the Ayurvedic physicians of Calcutta. May I suggest that you kindly explain that you did not mean to condemn Ayurveda itself or its conscientious votaries, but only a certain section of them who lived by fraud? To me such an explanation appears to be urgently required in view of the fact that almost all Bengali papers are misinterpreting your speech and condemning us for not contradicting it.

Mr. Gandhi's reply was as follows:—

I gladly comply with the request, the more so as it enables me to express my views about Ayurvedic medicine.

I must say at the outset that I was reluctant to perform the ceremony referred to as I was reluctant even to perform the ceremony of opening the Tibbi College by reason of the views I hold on medicine in general as expressed in my booklet *Indian Home Rule*. Seventeen years' observation has made no material change in them. If I rewrote the book, it is just possible that I should state the views in a different language. But I could no more resist the organisers of my tour than I could a bosom friend like Hakim Sahab. But I told them that my speech might prove embarrassing. Had I been absolutely hostile to the movement I should, of course, have declined the honour at any cost. But I could reconcile myself to the performance subject to the conditions I named at the meeting. I hope that the college of which I laid the foundation and to which I understand the founder, himself a Kaviraj, has devoted a princely sum, will contribute to the alleviation of real suffering and make discoveries and researches in Ayurveda that will enable the poorest in the land to know and use the simple indigenous drugs and teach people to learn the laws of preventing disease rather than curing them.

My quarrel with the medical profession in general is that it ignores the soul altogether and strains at nothing in seeking merely to repair such a fragile instrument as the body. Thus ignoring the soul, the profession puts men at its mercy and contributes to the diminution of human dignity and self-control. I note with thankfulness that in the West a school of thought is rising slowly but surely which takes count of the soul in trying to repair a diseased body and which, therefore, relies less on drugs and more on nature as a powerful healing agent. My quarrel with the professors of Ayurvedic system is that many of them, if not indeed a vast majority of them, are mere quacks pretending to know much more than they actually do, arrogating to themselves an infallibility and ability to cure all diseases. They will not study the Ayurvedic system and wrest from it the secrets which appear at present to be completely hidden from the world. They impute to Ayurveda an omnipotence which it does not possess, and in so doing they have made it a stagnant system instead of a gloriously progressive science. I know of not a single discovery or invention of any importance on the part of Ayurvedic physicians as against a brilliant array of discoveries and inventions which Western physicians and surgeons boast. In fact, Ayurvedic physicians' diagnosis as a rule consists in feeling the pulse, which I have known many to claim enables them to know even whether the patient is suffering from appendicitis. Whether the science of the pulse ever enabled ancient physicians to diagnose every known disease, no one can tell. But it is certain that the claim cannot be sustained at the present moment. The only thing Ayurvedic physicians can safely claim is a knowledge of some vegetable and metallic drugs of great potency, which some of them succeed in administering for diseases they only guess and therefore often with much harm to their poor patients. The advertisement of medicines that excite animal passions

adds immorality to incapacity and makes those who resort to these practices a real danger to society.

I know of no association of Ayurvedic physicians that protests against or endeavours to check this ceaseless flow of immorality which is sapping Indian manhood and making of many old men monsters, living merely to satisfy their lust. Indeed, I have known such physicians enjoying a status or respectability in medical society. Whenever, therefore, I get an opportunity I seize it to drive the truth home to the physicians Ayurvedic and Unani, and plead for truth, humility and patient research. I am a lover of all that is ancient and noble. I believe that there was a time when Ayurvedic and Unani medicine served a noble purpose and was progressive. There was a time when I actively helped these physicians and believed in them. But experience has undeceived me. I have been grieved to find arrogance and ignorance among many such physicians. It hurts me to find a noble profession being prostituted for making money. I have written this not to condemn individuals. I have merely reduced to writing the impression that has been left on my mind by a long course of observation of the practice of Ayurvedic physicians. It is not an answer to say, as has been said, that Ayurvedic physicians have copied the evils I have named from their Western brethren. A wise man copies not what is bad but that which is good. Let our Kavirajes, Vaidyas and Hakims apply to their calling the scientific spirit that Western physicians show, let them copy the latter's humility, let them reduce themselves to poverty in investigating the indigenous drugs and let them frankly acknowledge and assimilate that part of Western medicine which they at present do not possess. Let them shun the irreligion of the Western scientists, which in order to heal the body and in the name of science, subjects the lower animal kingdom to the hideous tortures which pass muster under the name of vivisection. Some will retort that there is warrant for vivisection in Ayurveda. If there is, I am sorry. No warrant even in the four Vedas can sanctify sacrilege.—(Young India.)

The Rockefeller Foundation.

REVIEW OF WORK IN 1924.

By GEORGE E. VINCENT.

President.

THE YEAR IN BRIEF.

DURING the year 1924 the International Health Board, the China Medical Board, the Division of Medical Education, and the Division of Studies of the Rockefeller Foundation (1) underwrote to the amount of \$350,000 a plan for publishing an international abstract journal of the biological sciences; (2) began issuing bulletins which report progress in medical education in many countries; (3) helped to spread internationally knowledge about medical equipment and teaching methods through surveys by staff members, commissions of scientists, visiting professors, and travelling fellows; (4) hastened developments in the medical schools of the universities of Oxford, Cambridge, Edinburgh, Wales, Montreal, McGill, São Paulo, Hongkong, and Siam, and of the American University at Beirut; (5) maintained a modern medical school and teaching hospital in Peking; (6) aided three other medical schools and 17 hospitals in China; (7) helped to improve the teaching of physics, chemistry, and biology in two Chinese and nine foreign institutions in China and in the Government University in Siam; (8) had a part in the development of professional training for sanitarians and hygienists at Harvard University and in schools and institutes in London, Prague, Warsaw, and São Paulo; (9) gave funds for nursing education at Yale University and in schools and hospitals in Brazil, France, Yugoslavia, Poland, and the Philippines; (10) kept a mobile staff on guard against yellow fever in Mexico and Central America; (11) at

the request of Brazil joined in an attack upon this disease from 11 centres along the northern coast; (12) helped to show the possibilities of malaria control in 13 American states and made malaria surveys or studies in Haiti, Porto Rico, Nicaragua, Brazil, Italy, Palestine, Queensland, and the Philippines; (13) either continued or began anti-hookworm work in conjunction with 32 states and countries in the West Indies, Central America and Mexico, South America, Europe, and the Far East; (14) contributed to the budgets of rural health services in 207 counties in 24 American states and in New Brunswick, Brazil, France, and Czechoslovakia; (15) continued to aid the epidemiological intelligence service of the Health Section of the League of Nations; (16) contributed to the League of Nations' international study tours or interchanges for 99 health officers from 20 countries; (17) provided directly or indirectly fellowships for 864 individuals of 33 different nations; (18) lent staff members and made minor gifts to many governments and institutions for various kinds of counsel and aid; (19) assisted mental hygiene projects both in the United States and in Canada, demonstrations in disseminating development in New York City, the growth of anti-tuberculosis work in France, and other undertakings in public health, medical education, and allied fields.

For the present, effort is centred on public health and medical education, but the trustees keep steadily in mind the possibility that in time other things may also offer opportunities. Concentration in any field is not interpreted as permanent or rigid.

The Foundation seeks direct relations with responsible agencies which are charged with carrying on a given work for the future. This means, of course, that nothing is undertaken until a careful first-hand study has been made by representatives of the Foundation. Thus when field demonstrations of disease control are made the International Health Board deals only with government agencies. So, too, plans for medical school development are carried out in conjunction with permanently established universities. Moreover, the Foundation expects governments and universities from the outset of a common undertaking to make a contribution in money or its equivalent in facilities or services. That is, aid is conditioned upon a substantial contribution from other sources. Again, help is given only for demonstrations of innovation and improvement. The Foundation takes no interest in the merely quantitative expansion of routine activities. There must be promise of qualitative advance in a given piece of scientific, administrative, or educational work.

There is another guiding principle of the Foundation. It withdraws entirely from a project as soon as this has become self-directing and self-supporting. In the case of a medical school or institute of hygiene project, as soon as the university or government has complied with the conditions the Foundation pays its share and has no further responsibility. It scrupulously refrains from all intervention in the administration of the institution.

Many excellent medical schools in influential centres have plans for improvement but lack the necessary funds to carry them out. Governments do not ordinarily lavish money on science and professional education. Private donors are sometimes hard to convince. An institution thus gets on a dead centre. An outside force is needed to set things going. To give such an impetus is precisely what the Foundation can frequently do. A representative is invited to visit a significant school and with dean, faculty, and trustee representatives, to go over its needs and plans. He has no preconceived scheme to urge but often out of his wide experience in many countries he can make useful suggestions. A programme is finally agreed upon tentatively. The Foundation promises to give a certain sum toward buildings or endowment or both, provided the institution will secure from other sources a specified amount, or provided a government will agree to increase the annual budget of maintenance to a designated new level.

During 1924 several contingent arrangements with medical schools were in process of fulfilment. Payments

were made to the University of Edinburgh toward the endowment of a chair of surgery, to the University of Wales for the development of the department of medicine at Cardiff, to Oxford University for the proper housing and support of biochemistry, to McGill University, Montreal, for the endowment of a university chair of medicine, to the University of Hongkong for endowment of a chair of obstetrics, and to the University of Montreal for the continued support of premedical teaching.

The Peking Union Medical College is a modern medical centre in the capital of China, to which reference has already been made in the *Indian Medical Gazette*.

The members of the medical faculty and their assistants number 79 of whom 41 are foreigners and 38 Chinese. The teachers are graduates of 40 medical schools and represent 9 different countries. There are besides 25 teachers in the premedical and nursing schools.

The Peking Union Medical College seeks to serve the best interests of the Chinese people, in harmony with national purposes and ideals.

The trustees hope that the time will come when the College and Hospital may be put under Chinese control and be made an organic part of the Chinese system of education.

In October 1924, the students numbered 208 and were distributed as follows: medical school 62, school of nursing 20, premedical school 60, graduate and special students 66. The graduate registration was incomplete.

In one respect the Peking Union Medical College is unique. Its staff members devote all their time to the service of the institution. They do not engage in private practice. In consequence the faculty has developed a spirit of team-work which at once strikes the visitor from abroad. A considerable amount of excellent investigative work is done each year.

Probably three-quarters of all doctors to-day are general practitioners, that is physicians whose aim it is to recognize diseases, to deal with all the more common maladies by advice and treatment, and to know when to refer patients to specialists.

There are people who assert that this type of physician is doomed; that he will disappear because he cannot compete with the specialist on the one hand and with preventive and social medicine on the other.

Such an outcome is to be viewed with concern. The well-trained, properly equipped, experienced general practitioner of ability, character, and personality is a fundamentally valuable person. He is a good diagnostician. He sees his patient as a whole. He knows his peculiarities and circumstances. He can decide when to refer him to a specialist and when to protect him against the very real danger which is threatened by a narrowly specialist point of view. He cheers and encourages, warns and commands. He is not only a physician but a friend and counsellor. The disappearance of the general practitioner would be a serious loss.

He will survive only if he can win confidence and make a living. But he will have to meet the new conditions. He will have to submit to a measure of team-work in the use of laboratories and other resources; he will be compelled to recognize the public demand for sharing costs of sickness and, most important of all, he must become a practitioner of preventive medicine, a counsellor of health, a man who can recognize and correct the minor but remediable physical and mental defects which are so common. This will mean an increasing preoccupation with the normal and a knowledge of the effects upon health of diet, exercise, mental attitudes, recreation, and family and social life. To train men and women for this reinterpreted and redirected function the medical schools will be compelled radically to modify their aims and methods and to "permeate the curriculum with the preventive idea."

In spite of the progress of public health work the medical schools have too generally neglected or slighted the preventive side of medicine. This has had an unfortunate result. The average physician fails to see as clearly as he should that he is a vital part of the public health

organisation, that he is expected to discover and to report communicable diseases, to instruct his patients, to support the local authorities, to help to create sound public opinion.

The successful teaching of hygiene to medical students will increase the number of well-trained persons who choose this field as a career, but no undergraduate course can fit men and women for specialized service in preventive medicine. This has become a recognized profession which demands appropriate training in the nature and causes of communicable diseases, methods of controlling them, sanitation, various aspects of hygiene, mental as well as physiological, vital statistics, sanitary laws, organization, and administration. Work in laboratories, library, and lecture rooms must be supplemented and applied by practical experience in the field.

To provide this varied and intensive training special graduate schools and institutes of hygiene have of late been newly created or expanded in the United States, Canada, England, in Europe and South America. In 1924 the Rockefeller Foundation, on the initiative of the International Health Board, made an additional gift of \$400,000 to Harvard University for its School of Public Health, granted an interim appropriation for expenses of the London School of Hygiene and Tropical Medicine while its new building is being constructed, continued payments toward the building of institutes of hygiene in Prague and Warsaw, contributed to the maintenance of an institute of hygiene in São Paulo, Brazil, and pledged \$650,000 to the University of Toronto for the expansion of its School of Hygiene and Public Health.

During 1924 the income accruing from investments was a little more than eight millions.

The expenditures in 1924 were:—

| | |
|--------------------------|-------------|
| I. Public Health .. | \$3,195,951 |
| II. Medical Education .. | \$3,225,027 |
| III. Miscellaneous .. | \$700,663 |
| IV. Administration .. | \$167,181 |
| Total .. | \$7,288,822 |

Inguinal Hernia: Report of 100 Operations on Korean Patients.*

DR. A. I. LUNLOW, reporting his observations in 100 cases of inguinal hernia, in the *China Medical Journal* of March of this year gives the following historical reference to hernia in Korea.

"There is a book about 150 years old (1777 A.D.) called the *Tong Wee Paw Kam*, written at the request of the king, by a Korean named Haw Choon entitled, 'A valuable Treatise on Oriental Medicine.' It is still much used by native doctors, who regard it as a reliable source of information both for medicine; and for acupuncture, one of their main forms of surgery. In searching this book for references to hernia, the following chapter was found (the diagnosis in brackets are my interpretation):

'Seven Diseases of the Inguinal and Scrotal Regions.'

1. *Cold Disease (Orchitis)*.—The testicle is hard as stone and very painful. This is caused by exposure to cold wind or snow. It is also due to illicit intercourse. If not cured, sterility results.

2. *Water Disease (Hydrocele)*.—The testicle is swollen like a cyst and looks like crystal. This condition is due to excessive use of alcohol, also to exposure to the wind after perspiring. Treatment: use a cathartic for expelling the water.

3. *Muscle Disease (Gonorrhoea)*.—Swelling of penis, discharge and ulceration are among the symptoms noted. Treatment: diuretics.

4. *Blood Disease (Bubo)*.—In both inguinal regions there is a swelling which looks like a small yellow melon. The common people call it a boil. It is due to the

* Article No. 36, Research Department, Severance Union Medical College.

blood settling after heavy labour in the spring or summer. It may also be due to an improper discharge of semen. When it ruptures there is a small amount of pus and blood. Treatment: medicines to stimulate the proper circulation of the blood.

5. *Air Disease (Bubonocela?)*.—This condition may be inherited, especially if the father is old. A swelling appears whenever the person cries or becomes angry. Treatment: puncture with the Chim (Korean needle) and let the air out. Another method of treatment is to give medicine to 'spread out' the air.

6. *Fox Disease (Reducible Hernia)*.—The swelling has the appearance of the rounded surface of a Korean 'male' tile. (The tiles of a Korean roof are termed 'female' and 'male' tiles; the female tile is concave and the male tile convex.) The mass disappears into the abdominal cavity when a person lies down, but when the person stands up or walks it comes out and goes down into the scrotum. This is like a fox which comes out of its hole in the daytime and goes back at night. This disease is somewhat similar to the air disease (No. 5).

7. *Enlargement of Scrotum (Massive Hernia or perhaps Irreducible Hernia)*.—The scrotum varies in size from a quart to a gallon measure. There is no pain or itching but a sensation of puffing on the cord and testicle. The swelling appears at birth in some cases. This disease is due to dampness. Treatment:—Medicine for drying the dampness. This same disease occurs at times in women (pudendal hernia).

The Korean author mentions that he has obtained his information from ancient Chinese medical books.

It seems fair to assume from the above descriptions that inguinal hernia has been known for centuries in Korea, but no mention can be found of treatment by mechanical appliances, or by operation other than puncturing with the "chim" (Korean needle).

Summary.

Sex. All the patients were Korean males. No case of inguinal hernia in a Korean female has been observed by the author.

Age. From 2 to 84 years, average age, 32.7 years.

Occupation. Labourers and farmers constitute 50 per cent. of the cases.

Duration of hernia. Four days to 45 years.

Congenital hernias, 12; acquired, 88.

Position of hernia. Right side, 62; left side, 28; double, 10.

Cases of oblique (indirect) hernia, 91; of direct hernia, 9.

Reducible hernias, 79; irreducible hernias, 9; strangulated hernias, 12.

Operative procedure.

Anesthesia. General in 80 cases; local in 20.

Type of operation: modified Bassini with transplantation of cord in 60 cases; cord not transplanted, in 40 cases.

Healing of wound. *Per primam*, 97 cases. Stitch abscess in 2 cases. Parts infected before operation, one case.

Number of days in hospital. Average, 19.6; after operation, 17.6.

Condition on discharge. In 87 cases wound healed and patient in good health; in 12 cases wound healed, but there were complications. One patient died in hospital.

"Follow up." Forty cases were followed up. Recurrence was found in one case.

Localised Gangrene following the Hypodermic Administration of Calcium Chloride.

By M. G. SEELING, M.D.

Jl. American Med. Assoc., May 9th, 1925, p. 1413.

THE administration of calcium chloride is almost the only new line of attack against postoperative bleeding in jaundiced patients that has developed during the last

decade. This drug is now in general use as a prophylactic against hemorrhage complicating obstructive jaundice. Walters came to the conclusion that three intravenous injections of 5 c.c. of a 10 per cent. solution of calcium chloride should be administered to jaundiced patients before operating on them. He advises that one injection be given daily for three days, immediately preceding operation. He advises that the solution be injected slowly, and he also calls attention to the work of Cushny, who showed that in large doses calcium is poisonous, tending to bring the heart to a standstill.

A 17-year old girl who was known to have a very long clotting time had received three intravenous injections of 10 per cent. calcium chloride before operation. After the administration of the last injection her clotting time, which had been eleven minutes, was lowered to one and one-half minutes. After the third injection, she complained of discomfort at the site of injection. This was followed by redness, swelling and the other signs of cellulitis, and finally ended in two ugly looking gangrenous sloughs that required about eight weeks to heal. Inquiry failed to disclose that there had been any particular difficulty in making the intravenous injections, although the intern believed it quite possible that some of the solution may have been injected into the subcutaneous tissue when the third dose was administered.

A series of four guinea-pigs was used to test the effects of calcium chloride when injected subcutaneously. Under aseptic precautions, 1 c.c. each of 1, 2, 3 and 5 per cent. solution of calcium chloride was injected under the skin of the abdomen, at sites far removed from one another. In every instance the 5 per cent. solution caused sloughing and gangrene; the 3 per cent. solution likewise, invariably caused gangrene, but of a less fulminant type than that which followed the use of the 5 per cent. solution; the 2 per cent. solution caused a marked induration, with an inflammatory reaction that in only one instance ended in actual necrosis; the 1 per cent. solution caused no inflammatory reaction, aside from a mild induration. But in view of the ever present possibility of subcutaneous leakage during intravenous administration, it would seem to be wise always to regard hypertonic calcium solution as a potential factor in the causation of localized gangrene. Since a 1 per cent. solution does not produce necrosis when placed in the subcutaneous tissues, and since subcutaneous instillation is likely to occur accidentally, even with the practice of the most careful technique, it is recommended to administer 50 c.c. of a 1 per cent. solution from a gravity flask, rather than 5 c.c. of 10 per cent. solution from a syringe. An added advantage of this method lies in the fact that the administration is necessarily slower than by the syringe method, thus protecting against possible cardiac depression.

The Treatment by Aspiration and Mobilization of Traumatic Joint Effusions.

Walter M. Bricker. (*Amer. Journ. of Surg.*, February 1925.).

For several years it has been the author's practice to treat traumatic synovitis by prompt aspiration and early movement. Particularly is this method useful in the case of the knee-joint, and he describes the procedure as being as simple and safe as aspiration of the pleural cavity. Neither reaction nor infection has followed any joint aspirations, performed with ordinary aseptic technique.

The method of treating a recent traumatic synovitis of the knee is as follows: The joint is emptied as completely as possible and firm pressure applied by a bandage, which allows only a slight range of movement. The patient is kept in bed or allowed on crutches, and at the end of twenty-four to forty-eight hours the dressing is removed and free movement allowed. If effusion recurs, a second aspiration is performed, followed by further bandaging. If at the end of a week there has been no reaccumulation of fluid, weight bearing is permitted and

gradually increased. Any return of the effusion indicates the necessity for further aspiration and rest. When the injury is of older standing, aspiration with immediate weight bearing is advised, provided that the fluid is moderate in amount and that little blood is present.

All cases should be X-rayed to exclude a possible fissured fracture of tibia, femur or patella.

An address on the Importance of Exploratory Incision in Cancer of the Breast.

By DUNCAN C. L. FITZWILLIAMS, C.M.G., M.D.,
CH.M., F.R.C.S.

British Med. J., May 23, 1925, p. 953.

THIS address deals in an authoritative manner with a subject of extreme importance. The extracts which are given below contain most of the outstanding points.

The signs and symptoms of cancer of the breast are all due to extension of the growth. Fixity of the skin is the earliest sign of malignancy, it is the most suspicious and significant. It may develop in about two months, but Gross states that it is usually about fourteen months before it is developed.

A cancer may become well established before even puckering, wrinkling, and anchoring of the skin develops at all. There are other conditions, too, in which it is found: old fibro-adenomata, chronic abscess, tuberculous masses, and occasionally in chronic mastitis.

Retraction of the nipple is the next sign of importance, and this, again, is quite inconstant. It is present early in cancer which starts near the nipple, and is absent till quite late, and may never develop, if the cancer starts at the periphery of the gland. Another important fact is that in the rapidly growing carcinomata the opposite may occur, and the breast become prominent and the nipple protrude, while it is well seen in the less malignant and more atrophic forms. It is also present in any chronic condition in which fibrous tissue forms, so that it is met with in chronic abscess and chronic tubercle.

Enlargement of glands in the axilla is of small significance. Cancer can hardly grow without being accompanied by chronic mastitis, and chronic mastitis nearly always causes enlargement of the axillary glands. In addition every form of inflammatory change will cause enlargement of the glands in the axilla, and therefore very little reliance should be placed upon this sign. Far more important really is the feel of those glands; small but very hard glands are far more significant than large ones.

Often enlarged glands can be felt in connexion with cancer of the breast, and yet when examined after the operation nothing malignant is found in them. On the other hand, during the operation small glands are sometimes found right up at the apex of the axilla, which are not enlarged, but yet are infected.

Age is a great factor in diagnosis; sometimes, however, it is misleading. There is the general impression too that carcinoma hardly ever occurs in people under 35; nothing, however, could be more misleading. Several cases have occurred in the teens.

There are three different classes of cases. In the first category there is the patient who obviously has cancer. The next category is where there is a definite mass in the breast, the nature of which is doubtful. There is no infallible guide: skill, experience, common sense, and that curious faculty we call intuition, all come to our aid in a way it is impossible to explain.

It is estimated from large numbers of collected figures from various sources that 80 per cent. of all tumours of the breast are malignant and 20 per cent. innocent. That is a proportion of 4 to 1 in favour of malignancy. These figures are not quite accurate; they are derived very largely from hospital records. Probably 70 per cent. are malignant and only 30 per cent. innocent.

It is only safe to regard all tumours as malignant until we have proved them innocent. The presence of pain in a small growth is very much against the mass being

cancer; similarly, but to a less extent, is the presence of pain on handling the mass. Inflammatory masses are often more or less painful or tender. Many do not seek advice for tumours because, as they are painless, no alarm is caused. The presence of masses in both breasts is against cancer and in favour of interstitial mastitis; cancer very seldom starts in both breasts at once.

A small cancerous mass is quite as impalpable to the flat hand as is chronic mastitis. Moreover, chronic mastitis may be present in which cancer is starting, but has as yet none of the characteristics of cancer.

The margins of a scirrhus are usually much better defined than those of an inflammatory mass. This, however, does not hold good if the scirrhus is rapidly extending, while sometimes the edges of a chronic abscess are remarkably well defined.

Dimpling or the slightest adhesion of the skin, as already stated, is very much in favour of malignancy, but is not pathognomonic. The hardness of a scirrhus is rarely attained by any other tumour, but sometimes the mass is too deeply situated for this to be made out, and hardness can easily be simulated by a tense cyst. Enlarged veins seen coursing over the tumour are in favour of malignancy.

Lastly, there is the important fact that cancer rarely takes origin at the time of lactation; it does so sometimes, we all know, but it is rare, while this is the favourite time for inflammatory conditions to start.

An exploratory incision should be made before performing the radical operation, else serious mistakes will be made.

The third category is the one to which our attention is especially directed. Here there is only an indefinite lump. We may suppose it is deep seated in a voluminous breast so that nothing definite can be made out. Examination prompts us to say that there seems to be a vague thickening in the breast that should not be there, but beyond this there is nothing whatever to be felt. There is not even the certainty that there is anything, beyond perhaps something that feels like a slight mastitis: signs and symptoms of malignancy do not arise.

Six or eight months pass, and now there is a mass for sure; perhaps the skin does not slide over it quite so freely, but if the mass is deep-seated and the person is fat the skin may be quite free, so that even yet there is no sign of malignancy. Perhaps the practitioner suggests a consultation, not as necessary really, as you have already committed yourself by saying the condition is nothing, but merely advisable; the patient demurs—she feels so much better, the liniment is doing her good, she is sure the lump is smaller; and in this way ten to twelve months may have passed before a consultation is arranged and an operation suggested.

We acquit the lump of being cancer merely because it was small, had not spread and infiltrated the tissues sufficiently to enable us to say that it was malignant. We have been oblivious to the obvious fact that cancer must begin in a microscopic area and has at first no sign of malignancy, and we have forgotten the 2½ chances to 1 that it was malignant to start with; we have failed to treat the condition as malignant until it was proved innocent. Many writers have endeavoured to calculate the average time the mass has been suspected before it comes to the surgeon, and different observers have varied from a year to thirty months as the time lost.

We watch such cases carefully, but it means, in blunt English, that we do nothing except waste time.

The John Hopkins School teaches that the development of any malignant sign whatever diminishes the patient's chance of cure by 25 per cent. The best results of operations at the present day are 39 per cent. living and well at the end of five years, 61 per cent. dead or dying. Probably not 20 per cent. of the hospital cases are alive and well at the end of five years.

A woman of 50 years old with this indefinite thickening and no more should have the suspected mass removed and examined under the microscope by an expert. If it proves to be simple we have now good authority for saying so which we never had before. If it proves to be malignant it can be removed at a time when she has the greatest possible chance of cure.

A circumferential incision can be made in between the breast and the chest wall, the breast turned upwards, and the mass removed from the back of the breast. Radiating incisions are made outwards from the nipple, and the piecrust-shaped piece removed. The edges are seared with a cautery to prevent the escape of cancer cells in the event of its proving to be a carcinoma; the raw surfaces are sewn up and the breast replaced. The nipple is not interfered with, and there is no visible scar left. If preferred the pathologist can be present, and by means of a freezing microtome examine the mass then and there, and if necessary the complete operation can then be proceeded with in the event of the mass proving to be cancer. The more methodical examination in the laboratory enables a truer estimation to be formed. In these early cases, the whole mass must be carefully searched and any suspicious piece cut separately. The search must be carried out by a skilled person; it cannot be done by the laboratory boy.

If operations for cancer of the breast could be carried out at this time there is no reason why we should not have 75 per cent. alive and well at the end of five years.

In the last twenty years the operation on the breast has quadrupled its gravity. The extent of the operation has reached its limit, and if our results are to improve, it must be by earlier diagnosis, along the lines just indicated.

The Etiology of Malignant New Growths.

By C. C. TWORT, M.D., B.Ch. (Aberd.).

The Medical Press, July 29, 1925.

"In a paper bearing the above title, which appeared in the *Lancet* of July 18th, 1925, Gye claims to have shown that certain carcinomata and sarcomata of human and animal origin with which he has experimented are caused by filter-passing or ultra-microscopic viruses. An analysis of the paper, however, leaves one very unconvinced of the validity of the conclusions drawn by Gye from the experiments performed by him, with one or two exceptions.

Rous showed that the sarcoma of the fowl, which bears his name, is caused by a filtrable virus. This is confirmed by Gye, and furthermore the latter worker has performed experiments which go to show that sarcoma 37/S of the mouse is due to the same category of parasite. The conclusions drawn from these experiments would appear to be warranted by the results obtained, and the fact that the 37/S tumour can be transmitted from mouse to mouse by the utilisation of a cell-free filtrate is of very great interest.

Now, if we leave aside the direct 37/S experiments, which were really quite a separate group, we find that the only type of tumour produced by injection of cell-free filtrates was the Rous sarcoma in the fowl. In every case where a positive result was obtained material was present in the inoculum which had, at any rate at one time, contained living Rous virus. No other type of tumour was produced in the fowl and no tumour of any description was produced in any other animal. Is Gye satisfied that his sand filtrates and washed deposits in the crucial experiments were really free from virus? From the details given of the experiments many other workers are rather of the opinion that the sand filtrates probably still contained living virus although with a virulence attenuated by the manipulations to which it had been subjected.

According to Gye's own experience the lethal dose of the virus is proportional to the amount injected. Also, if the sand filtrate is not treated thoroughly

enough with chloroform it remains virulent, while if treated too severely with chloroform it cannot be rendered virulent by any of the means tested. Is it not probable that in the intermediate stage where the filtrate will not infect alone, but will infect on the addition of some special substance, we have another example of activation with which workers in the field of infection and immunity are so familiar? We read that the specific factor is a labile chemical substance, which fact of course increases the difficulty of the experiments; but one may ask, has the important control of obtaining the specific factor from tissues which are not cancerous or sarcomatous been performed?

In the same way the culture experiments are unconvincing. Has the experiment been performed to see whether the specific factor of a Rous sarcoma can render virulent a culture made from other than new growth tissues?

When a carcinoma in an animal has been produced by the injection of a cell-free filtrate, obtained either by filtering an emulsion of tumour cells or by filtering a culture, and with or without the addition of any non-irritating non-cellular substance, then will strong proof of the presence of a virus be given. In fact, when experiments such as those performed with 37/S can be successfully carried out with other new growths of which the primary etiological factor is unknown, then will a real advance in our knowledge of the etiology of such tumours have been made.

The question as to whether a virus is particulate or not depends upon what one understands by the word particulate, for after all the term is only relative. In any case it is well to remember that experiments have been performed with several viruses which tend to show that they are very little, if at all, larger than a protein molecule."

Post-Mortem Cæsarean Section : A Living Child.

Brit. Med. J., May 2nd, 1925.

"On February 21st Mrs. S., a Khasi patient, was admitted at about 11 a.m. in an unconscious state in an eclamptic fit.

"Before any treatment could be undertaken she collapsed quite suddenly and died about three minutes after admission. Examination showed that she was at about term, and that the child was still alive. Death was so rapid and unexpected that two minutes or more were spent in making quite certain that it was actual and not apparent. It must have been about seven minutes after death before a very hasty Cæsarean section was performed. An apparently lifeless full-time male child was delivered. Artificial respiration was undertaken with great energy and efficiency by the two European sisters attached to the hospital, and they were well assisted by the Indian nurses under training. Before the operation wound had been hastily approximated the child was crying. He had a number of slight fits during the first twenty-four hours, but has since done very well, and as we write—sixteen days later—is making excellent progress."

H. GORDON ROBERTS, M.D.,
Ch. B. Liverp.

Khasi Hills Welsh Mission Hospital,
Shillong, Assam.

Puerperal Eclampsia.

By Prof. JACQUES DECOURT, M.D.

The Medical Press, August 1925, p. 111.

PUERPERAL eclampsia is a complex syndrome correlated with gravidic auto-intoxication of which the convulsion is not the sole manifestation but is the culminating point of the organism in distress. There are two special predisposing causes, viz., cold and

over-eating. Though usual, albuminuria is not invariably present.

A heightened blood pressure is an early sign which is rarely lacking. It is present even when albuminuria is absent. A pressure of 150 mm. maximum is a danger signal, and calls for milk diet. Observation of the blood pressure throughout pregnancy is therefore a *sine qua non*.

Headache is a prominent feature with perhaps somnolence, loss of memory or, it may be, restlessness, insomnia, and nightmares. Noises in the ears and visual disturbances come next.

Almost always the actual convulsion is preceded by sharp pain in the pit of the stomach, with vomiting of food or bile. At this stage the excretion of urine is much reduced, the albuminuria is abundant, the blood pressure may reach 190, 200, or even 250 mm. Failing immediate free blood-letting, we may get the grave terminal manifestation, viz., the fit.

Pathogeny.—It is now generally conceded that eclampsia is due to a constitutional intoxication peculiar to the state of pregnancy.

The exact nature of this poison is not known though its existence has been sufficiently demonstrated.

Treatment.—The best treatment of eclampsia is its prevention. In primiparae regulate the diet, avoiding excesses of all sorts. Secure a regular action of the bowels, and by warm baths secure a free action of the skin. Above all we must keep a sharp look out for the preliminary symptoms. The urine should be examined once a fortnight, and in suspicious cases every other day. The same remark applies to taking the blood pressure at regular intervals. Directly we find albumen the woman is put on strict milk diet four to six pints a day, pure or diluted with Vichy water. Tarnier used to say, "an albuminuric woman who has been put a week on milk diet will not have eclampsia." Milk diet causes the albuminuria to disappear and the blood pressure to become lower. When there is no more albumen the patient is put on an achloride lacto-vegetarian diet along with rest, both physical and moral. She must avoid cold. When the inaugural symptoms present themselves she must be put on water diet or lactose water, drastic purgatives and copious intestinal lavages, and if the blood pressure be high, then venesection. She should be kept quiet in a darkened room for a time, visits being forbidden.

Curative Treatment.—There are two principal indications, viz., free bleeding and nerve sedation. Bleeding has a double action, it withdraws from the organism a certain quantity of the poison and it lowers arterial tension. We must withdraw from 800 to 1,000 c.c. We must bring down the blood pressure 4 or 5 centimetres and the minimum pressure at least one centimetre.

Chloral is the principal drug employed to soothe the nervous system and give the patient rest. We may give from 6 to 15 grammes in the twenty-four hours in divided doses. Failing chloral a centigramme or two of morphine is sometimes of service, but its use is not free from danger. During the period of the attacks strict water diet is imperative.

During the convulsive attacks we must take care that the patient does not injure herself, any false teeth should be removed; we must prevent the tongue being bitten by putting a compress or a bit of wood between the teeth. Inhalations of oxygen (or hypodermic injection of oxygen) are useful for the purpose of combating asphyxia.

Obstetrical Treatment.—In France the doctrine is to let matters as far as possible take their course during pregnancy. In desperate cases in which medical treatment has failed to relieve, the propriety of a vaginal Caesarean section may be raised.

When it comes on during labour, as soon as dilatation is complete we may have recourse to forceps or to version in order to empty the uterus as speedily as possible, but nature often does this for us without unnecessary loss of time.

After delivery we must beware of flooding. Beyond that nothing is required except the strictest asepsis in view of the special liability of such subjects to infections of all kinds, but avoiding the use of toxic antiseptics such as corrosive sublimate and carbolic acid.

Once a woman has suffered from eclampsia it behooves us to take particular care in subsequent gestations so as if possible to avert the wrath to come. It does not follow, however, that the attack will necessarily recur, for eclampsia requires a concatenation of circumstances for its production.

The Ayurvedic Treatment of Rabies.

The Journal of Ayurveda, August, 1925, p. 76.

To

THE EDITOR,

JOURNAL OF AYURVEDA, CALCUTTA.

SIR,

May I be allowed to make some comments on matters relevant to Kaviraj Shivanath Sen's last article on the Ayurvedic treatment of rabies in the July number of the "Journal of Ayurveda."

When Pasteur's antirabic treatment or one of its later modifications is employed by Western practitioners they do not speak of having "cured" so many people from dog bite (although the term might be correctly so used having regard to its derivation and real meaning), but merely of having given prophylactic treatment to so many people. They do not pretend to know whether these people actually have been infected, nor do they pretend that the treatment will certainly protect the bitten person if the latter actually have been infected. Experiments have shown that the treatment offers a considerable measure of safety to a bitten person; he is under no obligation to submit to it, the case is put to him and he can take either the admittedly imperfect treatment or the greater risk of no treatment at all.

I have myself heard several accounts of the methods employed by South Indian Vaidyans in the treatment of persons bitten by probably rabid dogs. They agree fairly closely with the method described by Kaviraj Shivanath Sen.

The principle underlying the Ayurvedic treatment is apparently that of homœopathy, that like cures like.

If symptoms which resemble to some extent those seen in hydrophobia can be produced by some artificial means in a person who has been bitten by a rabid dog, relatives will readily believe that the vaidyan has induced the disease in reality; and when the symptoms fade away, or are allayed, they will as readily believe that the putative disease has been finally cured.

Everybody knows that concoctions containing datura will produce symptoms of intoxication, but is there any evidence to show that the effects of datura on a normal person and on one that has been bitten and infected by a rabid dog differ in such a way that the one can be distinguished from the other? The effects of such intoxicants vary both with the dose and with the individual, and I do not think that any one could prognosticate with certainty what would happen in the case of any particular individual.

The Kaviraj says in your February number (p. 278) that if symptoms (like those seen in hydrophobia) do not appear after the initial provocative treatment "the patient can at once be pronounced as not infected," and in the July number (p. 23) he says "If among other symptoms of madness this special symptom, viz., imitation of the cry and action of the rabid dog is present, we know that the patient was infected. If this particular symptom does not appear we know that though bitten by a rabid dog he has escaped infection." There is some discrepancy between these two statements. In the first it is implied that the provocative dose of intoxicant produces no symptoms in persons who have not been infected with rabies; in the second it seems

to be admitted that the intoxicant produces symptoms of intoxication in both infected and uninfected persons, but it is only when "imitation of the cry and action of the rabid dog is present" that the diagnosis of infection is established.

The discrepancy is not of much importance: the point is this, that after dosage with mixtures containing datura or other intoxicants persons who are actually infected by a bite inflicted by a rabid dog are said to exhibit certain definite signs whereby they may be distinguished from persons who have been bitten but are not infected. Modern methods admittedly cannot distinguish between the infected and uninfected. Can Ayurvedists produce any proof, either experimental or statistical, in support of this claim of theirs which will bring conviction to any unprejudiced, trained and orderly mind? If they can, it should be done; if they cannot, their claim is without basis and falls into the category of unsupported assertions.

Whether the sign be infallible evidence of infection or not, it does not seem to be really quite so important as the Kaviraj would have us believe, except that the patient, or rather his relatives, for the patient is at this time delirious, can on its appearance or non-appearance be given a definite opinion. By the time the sign is due the patient has already endured the worst and most dangerous part of the treatment: he has been purged and made to vomit, he has eaten medicated cakes and has been intoxicated by them. It only remains to tie him up, or down, preferably in the hot sun for some hours, then to pour a huge amount of cold water over his head for a prolonged time and finally to give him cooling drinks. He would be a strange being who would not exhibit "annoyance" after being treated thus, even if he be considered to be cured. Presumably, if the sign be negative, the patient is spared the bonds, the hot sun and the cold douche, but it can scarcely be maintained that a negative sign saves him from all pain and trouble.

I am afraid that I remain unconvinced that Ayurvedists are in possession of a method of determining for certain whether a person bitten by a supposed rabid dog has really been infected or not, and whether he stands in need of treatment or not. Apparently the most dangerous part of the treatment namely, the administration of an intoxicant such as datura, must be gone through before the sign is evoked, so the sign would seem to be of little practical value.

It is extraordinary how this idea that persons suffering from hydrophobia bark like a dog and behave like a dog permeates the world. The lay public all believe it; the medical text books all relate it. I have had the opportunity of seeing as many human beings suffering from hydrophobia as any man in India. Yet never once have I heard any of them bark like a dog or give even a reasonably good imitation of a bark. The truth is that these unfortunates have their palatal and some of their respiratory muscles partially paralysed; they have difficulty in swallowing their saliva and in breathing. Every now and then respiratory spasms occur, though not in every case, and the wretched person in his endeavours to breathe and to clear his throat makes a variety of involuntary, explosive sounds which do not really resemble barks at all. Such persons also sometimes become very violent and will bite, scratch, tear at and kick anything or anybody they can reach. All their symptoms are exacerbated by the presence of a sympathetic and moaning crowd of onlookers. Sometimes in the early stages the patient will become exasperated (and no wonder) with the attendant crowd and rush at them with open mouth or snapping teeth and sundry cries, but these are early and purely voluntary exhibitions.

In the absence of any method of deciding whether a person bitten by a supposedly rabid dog has been infected or not, it is difficult to set a value on different methods of treatment. From statistics which I have collected over many years I find that the risk run by people in South India of dying from hydrophobia after

having been bitten by a supposedly rabid dog is of the order of 63 per cent., if they are untreated. It must be quite clear, therefore, that in order to put a value on any method of treatment many thousands of persons must undergo it and careful notes must be made of each case.

As far as the modification of Pasteur's treatment used in the antirabic institutes in India is concerned, we have significant figures. No figures which would be regarded as significant by a statistician can be produced which would enable a value to be set on Ayurvedic treatment, and until this can be done the exponents of modern methods are justified in remaining sceptical as to its value. Mere assertions carry no weight.

Yours faithfully,

J. B. CORNWALL,
Lieut.-Col. I.M.S.,

Director, Pasteur Institute, Coonoor.

The Pasteur Institute of Southern India.
Coonoor, 27th July 1925.

Reviews.

MODERN MEDICINE: ITS THEORY AND PRACTICE.
—Edited by Sir William Osler and Thomas McCrae.
Vol. I. Third Edition. To be completed in 6 vols.
and desk index. Sold in complete sets only.
£12 12s. net. London: Henry Kimpton, 1925.
Pp. 845. Price, 42s. net.

This system of medicine was first published in 1907. The success of the first edition allowed a second to be published within six years; it is now twelve years since the first volume of this second edition was issued. Sir William Osler, the first editor, died on December 29th, 1919, so that the whole of the work of editing this edition has fallen on the shoulders of the second editor. At the time of Sir William's last illness Professor McCrae was corresponding with him as to the advisability of issuing a third edition. During the last twelve years new diseases have come into prominence and much new light has been thrown on the etiology of others. Researches in physiology have advanced our knowledge in such subjects as metabolism and the functions of the digestive tract. A new edition of this system is therefore welcome.

We are glad to see that Sir William's introductory essay on the Evolution of Internal Medicine has been retained. In this he sketches the story of the evolution of modern medicine over twenty-five centuries. It is not a story of rapid progress. Little real advance was made between the times of Hippocrates and Sydenham. There were many dark periods when the healing art was practised almost entirely by charlatans, and before any advance could be made lost ground had first to be regained, this always meant the restoration of the humoral pathology of Hippocrates.

The system proper opens with a chapter of the study of infectious diseases generally. Practically the whole of the rest of the volume is devoted to bacterial diseases; typhoid is first dealt with by the second editor. The 121 pages that are devoted to this disease constitute a very complete monograph on the subject; the photographs showing the stages of the formation and healing of typhoid ulcers are particularly instructive. Each disease is dealt with by a master on the particular subject, these for the most part come from the American continent but their names are familiar to us in this country. The chapter on Malta fever is written by Sir David Bruce and Dr. G. C. Low; both names are familiar to students of tropical medicine. Leprosy, another subject of particular interest to this country, is only allowed 10 pages, but these are written by Dr. G. W. McCoy, a former Director of the Leprosy Investigation Station in Honolulu. Tuberculosis, a subject which allows

specialisation within its own gates, is given three chapters; the etiology, the pathology and the clinical study of the disease are aspects which are treated separately each by a different writer.

It would be impertinent to attempt to criticise the book. This system already enjoys the reputation of being probably the most widely read one in the English language and if the standard of the first volume is maintained this edition can only enhance this reputation.

MEDICAL GYNECOLOGY.—By Samuel Wyllis Bandler, M.D. Fourth Edition. Philadelphia and London: W. B. Saunders Co., 1924. Pp. 930. Price, Cloth, 40s. net.

THE fourth edition of Bandler's Medical Gynecology has appeared. The average medical man regards gynecology as almost entirely surgical and will be repaid by perusing this volume and noting how extensive the medical side is. There is an excellent and detailed account of gynecological examination including the Rubin test for patency of the tubes. This chapter is profusely illustrated. Cystoscopy and renal function tests are dealt with clearly.

The chapter on endocrine glands to which are devoted one hundred and ten pages shows that the author is convinced that endocrinology and endocrine therapy have advanced *pari passu* and that substitution therapy is on a sound basis. With this view very many authorities are in complete disagreement including the authors of the pamphlet recently issued by the American Medical Association.

Constipation—although scarcely gynecology—is so fully discussed that it takes up fifty pages; and another sixty are allotted to "associated nervous conditions in gynecology." On the other hand the important subjects of Pelvic Peritonitis and Inflammation of the Fallopian Tubes—diseases which are so common and so far-reaching in their effects and in which medical treatment is so important—are dismissed in five pages each.

Redundancies are to be found—for instance the treatment of cervical erosions is given in the chapter on leucorrhoea and is repeated in the chapter on endocervicitis—so that the matter on pp. 374 and 375 is shown again on pp. 686 and 687.

The chapter on pain is well done; many will be found to disagree with the drastic treatment recommended for gonorrhoea in children, i.e., forcibly dilating the vagina with antiseptics.

There is a lot of valuable information in the work. The publishers are to be congratulated on the excellent print, illustrations and binding.

THE PRINCIPLES AND PRACTICE OF OBSTETRICS.—By Joseph B. De Lee, A.M., M.D. Fourth Edition. London: W. B. Saunders Co. Pp. 1123. Illustrations 1128. Price, Cloth, 55s. net.

THE fourth edition of the Principles and Practice of Obstetrics by De Lee has appeared—the last one being in 1921. The general lines of the former editions are followed. To ante-natal care is attached the importance it deserves, and also to the various means by which maternal morbidity and mortality can be avoided. At the same time we doubt whether it will ever be financially possible for the general practitioner, who has so often to be satisfied with a small fee for maternity work, to carry out in every obstetrical case all the aseptic precautions recommended, which include a sterile gown and mask, stethoscope fixed to the head and a plentiful supply of sterile towels, etc. It is certainly beyond the power of the midwife who does such a large bulk of normal cases. The author regards delivery to a certain extent as a pathological phenomenon and states that he has never known a woman as physically sound after child-birth as before.

There is a full account of hyperemesis gravidarum. The author points out that it is necessary in every case to clear up three points (a) that the patient is pregnant, (b) that the vomiting is toxic or neurotic or both, or reflex, (c) that the vomiting is not due to some other condition apart altogether from pregnancy. He wisely

states that "an underlying neurosis should not always be lightly assumed" and that most teachers believe all causes of nausea and vomiting of pregnancy are toxic in character aggravated perhaps by a neurotic element. He considers the urinary findings to be unreliable and tests for liver functions unsatisfactory. Regarding prognosis and treatment he emphasises the importance of getting fluid into the system and carbohydrates with bromides, recommending glucose per rectum and intravenously but omits any mention of alkalis. Insulin is mentioned. It is to be regretted that in recommending intravenously glucose emphasis is not laid on the necessity of using anhydrous C. P. dextrose and not commercial glucose which is impure and may cause grave symptoms. As to when the uterus should be emptied, it is pointed out that no definite indication can be laid down. One has to rely on one's own experience, the progress of the case, condition of the patient and the effect of treatment. This is sound advice. He also points out that if this operation is left until too late, it will do no good, as the damage is too great to be recovered from.

Eclampsia is a subject which has not advanced much in the last few years unfortunately, and the practitioner is beset by the advocates of the conservative treatment on one hand and those of the radical treatment on the other. We think that more details of Stroganoff's treatment might have been given in this huge treatise. It is summed up in twelve lines. The Dublin treatment is not even mentioned. One is left in some doubt as to whether the author advocates the conservative or the radical treatment. He favours the former for the general practitioner and if the child is not viable and the latter when the eclampsia sets in with violence, frequent convulsions and coma. He strongly condemns the use of chloroform as an anæsthetic and recommends ether instead. Veratrum viride is condemned. He states that eclamptic mothers should not be allowed to nurse their babies for several days as he considers the milk may cause convulsions in the child.

In a note under the action of dietetics he states that eclampsia is rare in the tropics and among vegetarians. Our experience in Calcutta is that eclampsia is common amongst Bengalis whose diet is mainly composed of rice and fish, and rare amongst Anglo-Indians and Europeans whose diet is very much richer in protein. It is regretted that no help is given to the practitioner to enable him to classify any given case as mild or severe, and we think some note might have been made of the efforts of British obstetricians to have this classification made. The history, pathology and symptoms are fully described.

Abruptio placentæ is a term suggested by the author for use instead of accidental hæmorrhage both concealed and revealed. The causes of toxæmia, diseases of the endometrium and traumatism are fully discussed, although it is explained that the commonest condition is purely external hæmorrhage; the account under symptoms, diagnosis and treatment is almost entirely devoted to concealed hæmorrhage for which the author recommends the use of a De Rube's bag and a tight binder with pituitrin; and if the cervix is tightly closed, Cæsarian section, followed if necessary by hysterectomy.

The usual method of separating concealed (or combined) accidental hæmorrhage from external accidental hæmorrhage as regards symptoms and treatment is we think preferable to the author's.

There is an excellent account of syphilis in relation to obstetrics with some beautiful illustrations. Its protean nature is emphasised. The author states on the authority of Esch and Stühmer that the Wassermann reaction is unreliable in pregnancy and the early puerperium. He also recommends that all "laws"—Profetas and Colles's law—should be discarded and the subject studied anew.

Diseases of the heart in pregnancy are thoroughly dealt with as regards the pregnancy and during labour and also as to how prognosis may be made.

The chapter devoted to Cæsarian section is beautifully illustrated and the steps are clearly and distinctly described. For the ordinary classical Cæsarian section the author recommends closing the uterus by means of No. 2

twenty-day catgut in 3 layers to oppose the cut muscle and another layer or even two for the peritoncum.

The Porro-Cæsarian is also described, he peritonises the cervical stump and closes the skin wound.

The author's particular preference is for a cervical Cæsarian section or laparo-trachelotomy—in this the lower uterine segment only is opened. This is defined as having an upper boundary marked by the peritoncum becoming adherent to the uterus. A large transverse sinus is present and the muscle of the uterus suddenly becomes thicker. The abdomen is opened a little lower than in ordinary classical Cæsarian and the bladder is pushed down after incising the peritoncum transversely a little below the line of its adherence to the uterus—the upper part of the peritoncum is raised up and the uterus is then opened. A finger is passed into the child's mouth to bring the face forwards and the forceps are applied to the head and the child delivered. The author claims for this method the following advantages:—less danger of soiling the peritoncum, less hæmorrhage, omentum and intestine are not seen—less peritoneal shock—complications such as ileus very rare—no adhesions, rupture of uterus in subsequent labours very much rarer, a maternal mortality of only 1 in 266 cases and that it may be done after a full test labour has been tried. He does not mention the average length of time the operation takes, but it must be considerably more than in the ordinary classical Cæsarian section.

The Latzko extraperitoneal section is also described.

All through the book the author shows a marked preference for ether as an anæsthetic instead of chloroform—even in ordinary labour.

This edition is well up to the standard of its predecessors: it is profusely and beautifully illustrated. The printing and binding are excellent. It can be warmly recommended as a book of reference. Perhaps we may be allowed to suggest that if the size of the book and its price were smaller it would be more attractive to the general practitioner.

THE TOXÆMIA OF ACUTE INTESTINAL OBSTRUCTION: OR VOMITING AS A PATHOLOGICAL FORCE.—By R. H. Paramore, M.D. (Lond.), F.R.C.S. (Eng.). London: H. K. Lewis & Co., 1923. Pp. 66. Price, 5s. net.

The author sets out to prove the thesis that increased intra-abdominal pressure, whether in pregnancy or acute intestinal obstruction, is the most potent factor in the production of the intoxication which may occur.

The ordinary view is that vomiting in acute intestinal obstruction is one of the signs of the poisoning. Paramore holds that it is the cause.

Cases are cited and evidence is brought forward to prove this thesis and to disprove the view, held by others, that "toxic proteoses" which can be isolated from the contents of the obstructed intestine, are responsible for the devastating effects of acute intestinal obstruction.

The inquiry is of the greatest importance to pathology and treatment, and the reader must weigh the evidence and decide for himself as to the issues involved.

PHYSICAL DIAGNOSIS OF DISEASES OF THE CHEST.—By Joseph H. Pratt, A.M., M.D., and George E. Bush, Ph.D., M.D. Philadelphia and London: W. B. Saunders Co., 1925. Pp. 522, with 166 illustrations. Price, cloth, 24s. net.

The object of this book is best stated in the authors' own words:—

"This has been written in the hope of utilising the experience gained in the instruction of medical officers in physical diagnosis at the Medical Reserve Officers' Camps during the late war."

The book is admirably suited to the purpose for which it has been written.

The authors do not limit themselves to the physical diagnosis of the diseases of the chest in any narrow sense, but go in full detail into all the signs and symptoms of diseases of the respiratory and circulatory systems. The reader has not to search in books of anatomy and physiology for explanation of the text, all the pheno-

mena are fully discussed from the embryological, anatomical and physiological points of view. The illustrations are numerous and most illuminating and the style is simple and exceedingly easy to understand. For the student it is excellent and still more it is an ideal book for the medical man who has been off the irons for many years and wishes to bring his practical knowledge of physical diagnosis up to date. There is a happy combination in the authors of the clinician, the pathologist and the clinical teacher, who know by contact with post-graduate students what are the limitations of the knowledge of the average medical men and know also how to meet them.

It is impossible in a short review to give any adequate idea of how the authors have dealt with different subjects in this book of over 500 pages, but a single example will illustrate their methods. Taking up the article of auricular fibrillation, one finds the subject dealt with in 4½ pages. The principles underlying the causation of this condition are vividly illustrated in a single diagram and a pulse tracing on the opposite page makes clear the meaning of the text. First of all, the general explanation is given and thereafter under the heading of diagnosis, the whole matter is dealt with from a clinical point of view. Statistics are given which show the comparative importance and frequency of auricular fibrillation and its various causes are clearly explained.

The authors are clearly masters of their subject and the doctor who wishes to improve his power of clinical diagnosis should have this book not on his bookshelf, but close in front of him on his writing table.

EMPYEMA THORACIS.—By E. A. Graham, A.B., M.D. St. Louis: The C. V. Mosby Co., 1925. Pp. 110. Illustrated. Price, \$2.50.

THIS useful little book deals in an interesting way with a problem which the general practitioner, not less than the operating surgeon, frequently finds himself up against.

Empyema occurs so infrequently that an opportunity to study a large series of cases consecutively is seldom obtained.

The epidemic of hæmolytic streptococcus infections of the respiratory tract associated with empyema, which ravaged the military camps of America during the winter of 1917-1918 gave an unusually good opportunity for studying this disease intensively, and under proper control of a very large number of cases. The conclusions arrived at are (1) careful avoidance of open pneumothorax in the acute pneumonic stages, (2) the prevention of chronic empyema by the rapid sterilization and obliteration of the infected cavity, and (3) careful attention to the nutrition of the patient.

The larger part of the book is devoted to the description of experiments to prevent the danger of the production of pneumothorax during the acute stage.

The chief means used to prevent chronic empyema is the instillation of neutral 0.5 solution of sodium hypochlorite (Dakin's solution), which has a double power of sterilizing the cavity and at the same time removing the fibrous tissue membrane, which is largely responsible for the non-expansion of the lung on the affected side. A photograph is given of such a membrane which separated off after 6 days instillation of Dakin's solution of 200 c.c.'s at two-hour intervals along with adequate free drainage.

The book is well worth perusal by all general practitioners.

HÆMOPTYSIS IN PULMONARY TUBERCULOSIS.—By Dr. Marc Jaquierod. Translated by S. F. Silberbauer, M.D., F.R.C.P. (Edin.). London: Baillière, Tindall & Cox, 1925. Pp. vii plus 106. Price, 5s. net.

THIS little book of 106 pages is a useful addition to the already voluminous literature on the different aspects of tuberculosis. The author shows the way in which this common accident is brought about in human beings, while it is unknown in the lower animals affected with pulmonary tuberculosis. He points out that

hæmoptysis is not always a very grave symptom and that it often occurs where the healing process connected with fibrosis of the lungs has advanced to a large extent.

The remarkable thing is that bleeding from the lung into the bronchi does not occur more frequently in connection with cavity formation. This is accounted for by the fact that softening and caseation spread not so frequently from the centre to the periphery of the congested area, but from the periphery to the centre; in this way, before the whole mass separates from the healthy lung, a fibrous, limiting membrane has had time to form, thus preventing hæmorrhage taking place.

The number of remedies recommended, or at least mentioned, is good proof that none of them is very effective; prevention in the direction of avoiding strains and irregularities is more effective than any form of treatment.

The book is one well worth studying by those who take special interest in this disease, but those who have never taken the trouble to study tuberculosis, especially with regard to this pathology, may have difficulty in following some of the arguments.

A PRELIMINARY REPORT ON THE TREATMENT OF INTERSTITIAL KERATITIS.—By R. Lindsay Rea, M.D., F.R.C.S. London: H. K. Lewis & Co., Ltd. Pp. 32, 4 plates. Price, 2s. 6d. net.

THIS small book is a preliminary report showing how important the treatment of interstitial keratitis is when carried out according to modern methods, and how many of the later troubles associated with this disease such as choroiditis, nerve deafness and permanent synechia and opacities can be prevented by early treatment. This is well done and agrees strongly with the experience of the reviewer and will it is to be hoped prevent in future the ordinary remark in even modern text-books on ophthalmology, that antisiphilitic treatment has little effect on this dreadfully common disease. His remarks on the Wassermann reaction and modes of onset are brief and good. One can strongly recommend this book to all medical men in India interested in eye work, as this disease is commonly mistaken for trachoma and nebula due to ulcers and when treated, as it frequently is by irritant drugs, it can closely imitate those conditions, and its recognition and treatment especially in fairly early cases can prevent a great deal of the partial or complete blindness so commonly seen.

A SYNOPSIS OF SURGERY.—By E. W. Hey Groves, M.S., M.D., B.Sc. (Lond.), F.R.C.S. (Eng.). Seventh Edition. Bristol: John Wright & Sons, Ltd., 1925. Pp. 671. Price, 17s. 6d. net.

THIS is the seventh edition of this well-known book, which is gradually assuming the proportions almost of a text book. The author claims to have revised the entire text, and especially the chapters on abdominal surgery, with the help of Mr. D. G. Tasker. Also a number of line drawings and diagrams have been added, which considerably enhance the value of the book from the students point of view.

Whatever criticisms may be levelled against a book of this type, there can be no doubt as to its popularity among students. The practitioner also uses it freely as a book of ready reference.

ESSENTIALS OF IMMUNOLOGY FOR MEDICAL STUDENTS.—By A. F. Coca, M.D. Baltimore: Williams and Wilkins Co., 1925. Pp. 194. English Agents: Baillière, Tindall and Cox. Price, 17s. 6d. net.

THE leading works on immunology are for the most part large and suitable only for the specialist. The inclusion in recent years of instruction on immunology in post-graduate courses has necessitated the production of elementary text books on the subject. Professor Coca has written a useful little book of this type which includes everything the elementary student is likely to require. The first half is devoted to a brief account of the more important theoretical considerations, the remaining portion being a very useful presentation of the chief practical applications of immunology to medical

diagnosis and treatment. The book is well put together, and the various subjects are well described in clear language and we can confidently recommend it.

SERUM DIAGNOSIS OF SYPHILIS BY PRECIPITATION.—By R. L. Kahn, D.Sc. Baltimore: Williams and Wilkins Co., 1925. Pp. 237. Price, \$3.000.

DR. KAHN has performed a very valuable piece of research work on the subject of the serum diagnosis of syphilis by precipitation, which has culminated in the evolution of a new test now called the Kahn reaction. The test is on the lines of the Sachs Georgi reaction, the chief differences being that undiluted serum is used, rapid shaking with the antigen is employed, and the results are read off more quickly than by other methods. As is now well known the results correspond broadly, though not exactly, with those obtained by the Wassermann test. Where facilities for the latter are not available it has undoubtedly a great field of usefulness. Dr. Kahn has embodied his results in this extremely interesting book which is written in a clear and convincing manner and is altogether excellent. It should be in the hands of every specialist on the subject.

ROENTGEN DIAGNOSIS AND THERAPY.—By A. C. Christie, M.D., M.S., F.A.C.P. London: J. B. Lippincott Co., 1924. Pp. 320, with 144 illustrations. Obtainable from Messrs. Butterworth & Co. (India), Ltd. Post Box, 251, Calcutta. Price, 25s.

THIS book is a revised and enlarged copy of the author's Manual of X-Ray Technique. It has been designed as a practical guide in x-ray diagnosis and therapy for the student and practitioner.

The general style of the book, printing, and reproduction of skiagrams is excellent. The author avoids controversy and is somewhat dogmatic in his statements. Many experts in x-ray work will not agree with all he says. The book is in fact a record of the author's personal outlook on roentgenology. This, however, does not detract from its merits. There are many conclusions which will interest not only the student and practitioner but the expert as well; for instance, his defence of the Coolidge tube for roentgenography and roentgenoscopy, or his disavowal of the various chemical, photographic, and other direct methods for measuring dosage, and the adoption of the indirect method based on voltage, milliamperage, distance and filtration.

In conclusion, we are of opinion that this book should be in the hands of every practitioner as it comprises in a small space all the essential facts in the practice of roentgenology.

THE RADIOLOGICAL EXAMINATION OF THE MALE URETHRA.—By G. L. S. Kohnstam, M.R.C.S. (Eng.), L.R.C.P. (Lond.), and E. H. P. Cave, M.B., B.S. (Lond.), M.R.C.S. (Eng.), L.R.C.P. (Lond.). London: Baillière, Tindall & Cox, 1925. Pp. XVI plus 116, with 64 figs. in the text. Price, 15s. net.

IN this interesting monograph the urethra is the main subject, and the shape and relations of the base of the bladder are shown to be of considerable importance in the diagnosis of prostatic disease.

The work is intended as a guide to the methods of practice and interpretation of urethrography. The technique is fully explained. "Lipiodol" is the fluid used for injection in preference to bismuth, bromides and iodides. It is said to give rise to no irritation or discomfort. The interpretation of negatives is fully gone into and a useful chapter on normal urethrograms is given. This is followed by a section on pathological conditions.

An important point is brought out in this work, viz., when fluid is injected from the external meatus the seminal vesicles become filled. This is a point of "undoubted scientific and practical value". It demonstrates clearly the danger of applying high pressure in urethral irrigation and suggests a method of treating vesiculitis.

The work is one which should be in the hands of every radiologist and surgeon. Just as radiography has changed our views as to the anatomy of the stomach,

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so this work gives one a new and correct view of the urethra and base of the bladder.

TREATMENT OF GONOCOCCAL INFECTION BY DIATHERMY.—By E. P. Cumberbatch, M.A., B.M., M.R.C.P., and C. A. Robinson, M.B., D.M.R.E. London: William Heinemann, Ltd., 1925. Pp. 150. Price, 7s. 6d. net.

THIS little book places on record the results obtained by the authors in the treatment of gonococcal infection. It therefore consists largely of a description of methods and records of cases. The whole range of gonococcal infections is covered including acute urethritis, cervicitis, arthritis, bursitis, fibrositis, and infection of other parts of the male and female genitalia. Most of the cases described had previously been treated by the ordinary accepted methods without success, and so particular interest attaches to the progress of these cases.

The style is easy and clear. The illustrations are ample to show the technique employed. The volume marks the greatest advance in the treatment of gonorrhoeal infection recorded in modern times.

RADIUM: ITS THERAPEUTIC USES IN GENERAL PRACTICE.—By G. H. Varley, M.D. London: Humphrey Milford, Oxford University Press. Pp. 103. Price, 6s. net.

THIS little book gives a short account of cases treated by the author with radium in the hope that it may draw the attention of the general practitioner and student to the conditions in which this valuable therapeutic agent may be of use.

The first portion of the work is devoted to a short summary of the physical problems connected with radium, including apparatus, screening, methods of application and dosage.

The second part deals with the therapeutics of radium. The list of cases includes examples of all the more important conditions for which radium is used. The author complains that he has had great difficulty in following up cases; but the records, as far as they go, contain abundant evidence of the good that can be done even with very moderate quantities of the element. It is even suggested that long exposures with moderate quantities of radium are more effective in the majority of cases than short exposures with large quantities.

It is a useful little book, if only from the point of view of directing the practitioner's attention to the diseases and conditions in which radium may help him.

ELEMENTS OF ZOOLOGY. A TEXT-BOOK FOR INDIAN STUDENTS.—By Dr. H. Hyderali Khan, F.R.C.S.E., Professor of Biology, Osmania College, Hyderabad, Deccan. Second Edition. Calcutta: Butterworth & Co., 1925. Price, Rs. 3-8.

THE book has been written for Indian students as the author informs us in the preface and is certainly meant for beginners. A certain number of mistakes are noted. The earthworm described in the text is not a *Perichata posthuma*, as noted in page 20, and the figures of the dissections do not apply to that animal. Many terms have been loosely used. A few examples may be here cited. In page 15, line 1, it is noted: "Of the Metazoa, the Coelentera are multicellular animals whose cells are arranged in a definite manner to form a covering for the body and a lining for the coelomic cavity, the *enteron*." The enteron is not the coelomic cavity. In page 7, line 4, we see: "The animal moves about by elongating its body or contracting it into a nodule." Here "or" conveys no meaning, it should be "and." In page 46, line 30, we have "A pair of styles called the *cerci* are attached under the tenth tergum." The term "style" is generally used for a second pair of process in the male; the *cerci* are present in both sexes. In page 81, line 7, we find: "behind the epicoracoids is a symphysis called the sternum, which consists of a cartilaginous anterior portion, the episternum, a cartilaginous omo-sternum." The symphysis is a form of articulation and it cannot be

the sternum. The episternum is placed in front of the epicoracoids and not behind them. There ought to have been a figure of the sternum.

The section on heredity and evolution is too short to be of any use to a beginner. This section would have been better placed at the end, as the student must have some general knowledge on the subject before he can grasp the complicated problems of evolution.

We hope the author will correct these few mistakes in the next edition. With those defects rectified the book should be a really useful one to the Indian students for whom it is intended.

ARTIFICIAL SUNLIGHT AND ITS THERAPEUTIC USES.—By F. H. Humphris. London: Humphrey Milford, Oxford University Press. Pp. 170. Price, 8s. 6d. net.

IN writing this volume the author says he is actuated by two considerations. "The first is to be of service to those practitioners of medicine who have already had their attention aroused to the possibilities of this still little known region of physical therapeutics; and the second is to awaken and stimulate the attention of those who have not given the matter the care and thought it merits."

The earlier chapters are concerned with the history of heliotherapy in general and that of ultra violet radiations in particular, a discussion of certain facts and fallacies in connection with the latter, and a description of the apparatus in common use. The therapeutics of the ultra violet rays is then considered, and their value in various skin diseases outlined. Lastly, a chapter is devoted to the uses of artificial sunlight in certain regional and systemic diseases.

This is a book of absorbing interest and fills a gap in our therapeutic armamentarium which has long been apparent.

A MANUAL OF CHEMISTRY.—By A. P. Luff, M.D., B.Sc. (Lond.), F.R.C.P., F.I.C., and Hugh C. H. Candy, B.A., B.Sc. (Lond.), F.I.C. Seventh Edition. Vol I—Inorganic Chemistry. London: Cassell & Co., Ltd., 1925. Pp. 578, with 57 illustrations. Price, 11s. net.

THIS is an admirable and well known book on inorganic chemistry. The popularity of this book is demonstrated by the fact that it has gone through seven editions. In this little volume nothing of importance to a medical student has been left out and the matter dealt with has been rendered exceedingly lucid. The authors have spared no pains to keep the students in touch with the modern theories and discoveries and we cannot but praise the masterly way in which some of the most difficult subjects, such as the electronic theory of valency, the periodic classification of the elements, etc., have been dealt with within such short compass. The questions appended to the different chapters are all well selected and the portion on Practical Chemistry at the end of the volume will be immensely helpful to students who are hampered in culling out suitable tests and methods for both quantitative and qualitative analysis from a book dealing exclusively with the subject.

Annual Reports.

ANNUAL PUBLIC HEALTH REPORT OF THE PROVINCE OF ASSAM FOR THE YEAR 1924
BY MAJOR J. B. HANAFIN, C.I.E., F.R.C.S.I., D.P.H., D.T.M. & H. (CAMB.), I.M.S., OFFG. DIRECTOR OF PUBLIC HEALTH, ASSAM. SHILLONG. ASSAM GOVERNMENT PRESS, 1925. PRICE 12 ANNAS.

THE birth rate, 31.04, shows an increase over last year and though higher than Bengal is lower than most of the provinces in India. The death rate 27.3 is

also higher than that of Bengal but is again lower than that of the majority of the provinces, despite an epidemic of cholera and the continual drain of endemic kala-azar.

In urban areas where registration of births and deaths is compulsory the Vaccination Inspecting Staff instituted enquiries with reference to the births and deaths, it was found that 4.54 per cent. and 3.37 per cent. of the births and deaths, respectively, had not been registered. Prosecutions were instituted but as in many cases fines of only 4 annas were inflicted little improvement is likely to be effected.

No epidemic of influenza occurred and the deaths for this disease are recorded as 169.

Cholera accounted for 19,182 deaths during the year or about one-tenth the total number of deaths for all causes.

A proposal is at present under consideration to form an "epidemic section" consisting of a small number of medical men with a subordinate personnel specially trained in water duties and rural conservancy generally. This section with its materials to be under the orders of the Director of Public Health and ready to move instantly to any affected or threatened area of epidemic disease. Such a unit with its personnel and materials will be most useful to combat epidemics, especially cholera. Cholera is endemic throughout the year in Cachar and Sylhet. All other districts reported isolated cases in every month. It only requires a slight relaxation of precautionary measures to light up an epidemic when the foci are so generally scattered. This shows the necessity for a trained staff fully provided with materials for water purification and the personnel to carry out this as well as general sanitary precautions. Reliance on the local resources is not sufficient as a rule, the latter are fully occupied with the daily duties of their station. They cannot be concentrated immediately and they cannot be expected to be as expert as an epidemic section, specially trained to deal with epidemics.

Cholera broke out in virulent form during the months of April to July and continued until the rains broke in Cachar, Goalpara and Sylhet and in the last named place again in October, November and December. Manipur State also suffered from a severe epidemic from May until September.

There was a decrease in the incidence of small-pox during the year in every district but Darrang, in this district there is opposition to vaccination in certain sections of the population.

The death rate from fevers is still above the pre-influenza epidemic rate.

In the Hailakandi sub-division of Cachar an increase of malaria was reported. It was suggested that the railway which was completed in this district in 1923 was responsible. The report of the enquiry instituted to investigate this point was as follows:—

It will be observed that the splenic indices at the villages more remote from the railway are considerably higher than those of villages much nearer. This is most significant and clearly indicates that the railway embankment with its borrow pits is not wholly responsible for the alleged increase of malaria. When the general topographical features of the country with its numerous *khals* and collections of water, together with the dense rank vegetation which is to be found everywhere, are taken into consideration, it is easy to understand that the amount of mosquito breeding taking place in the railway borrow pits is comparatively negligible and cannot very materially affect the malaria incidence. The chief breeding grounds of mosquitos, particularly the "anophelines" are the "Baris" in which the people live. These "Baris" are situated within dense bamboo groves, where conditions for the propagation of mosquitos, such as heat, moisture, rank vegetation, numerous collections of stagnant water and the absence of sun, light and air, are ideal.

Coupled with the above is the question of insufficient supplies of quinine, which is causing an increase in the incidence of malaria. These insufficient supplies mean that patients are not getting a complete course of quini- nization and hence frequent relapses. Each time a patient has a relapse he is entered on the books of the dispensary concerned, as a fresh case. In this manner, the malaria figures become inflated and are apt to give rise to false impressions. Relapses of malaria have become more frequent during the last few years and are the result of Local Boards being unable to supply quinine in sufficient quantity to their dispensaries for want of funds. Patients are getting smaller and insufficient doses of the drug and until steps are taken to remedy this defect, malaria will increase.

Kala-azar.—The death rate from the disease again shows an increase. The number of cases treated during the last five years is 126,568, that is 7,188, 15,880, 19,659, 35,071 and 48,770 for the years 1920 to 1924, respectively.

Fortunately a remedy is now available by which it might, with confidence, be said the disease can be kept in check if not ultimately eliminated. Recent surveys have shown a widespread distribution of the disease, with a marked recrudescence which unheeded would undoubtedly devastate areas, as did the more localised epidemics in the nineties which in the Nowgong area exterminated villages.

Of 48,770 cases under treatment 3,605 died. This gives a death-rate of 7.39 per cent. amongst the cases under treatment.

Six Assistant Surgeons and 81 Sub-Assistant Surgeons were employed on special *kala-azar* duty during the year.

In addition to the special dispensaries run by Sub-Assistant Surgeons on special *kala-azar* duty, all the other dispensaries in the province are required to treat *kala-azar*. All Sub-Assistant Surgeons, whether in charge of special *kala-azar* dispensaries, State or Local Board dispensaries visit and revisit villages within five miles radius of their dispensaries in search of fresh *kala-azar* cases. The cases detected during such visits are advised to undergo treatment. For areas suspected to be infected with *kala-azar* and not falling within a five-miles radius of any dispensary, special Sub-Assistant Surgeons are placed on survey duty. Suitable arrangements for the treatment of cases brought to light by such surveys are made in all cases.

A disturbing factor in the campaign is the number of "stop treatment cases" shown during the year. Out of 48,770 cases treated, 16,733 stopped treatment before the completion of their course. The ratio is about 33 per cent. Notwithstanding this the treatment is most popular, and patients eagerly come for injection.

The course of treatment with sodium antimony tartrate lasts about three months. This is rather long and tedious, and after a month or two months of injections, on cessation of the fever, and as a result of a general improvement in health, many patients discontinue their course and consider themselves cured. Unfortunately cessation of symptoms and absence of signs do not always indicate eradication of the disease which really requires a much more prolonged course.

Regulations under the Epidemic Diseases Act, III of 1897, published by the Government of Assam, compel patients to undergo a complete course of treatment. Compulsion is not always advisable or effective. To stop this unsatisfactory condition, extensive propaganda was about to be initiated in 1925, especially in schools with the aid of the Director of Public Instruction.

Leaflets popularly illustrated and written in conversational style will be read to all school children by their teachers.

The seven Assistant Surgeons on special *kala-azar* duty will deliver lantern lectures. The aim is to explain

fully the danger of ceasing treatment before completion. Treatment as carried out in 1924 consists of a three months' course of sodium antimony tartrate. The cost of this drug per patient for a course of cure was annas 3. During the year experiments were carried out at the Pasteur Institute, Shillong, with organic compounds, urea stibamine, Von Heyden 471, urea glucoside (sic. Presumably this is misprint for stibamine glucoside) of antimony with most encouraging results. With this compound of antimony, treatment for cure is reduced to four weeks as against 3 months with the simple salt. The latest cost of one of these drugs—urea stibamine—is Rs. 10-2-0 for 3 grammes which is sufficient for the cure of one patient.

For 1925 arrangements have been made to treat all "antimony fast" cases (viz., cases which do not respond to treatment by the sodium salt) throughout the province by one of the organic compounds in selected hospitals. This will shorten the treatment by a period of two months.

It will also mean a saving of Rs. 18-12-0 per patient treated in hospital diets. The extra cost of the drug in treating with urea stibamine as compared with the sodium salt is Rs. 9-15-0, a saving of Rs. 8-13-0 is therefore shown per patient treated in diets alone, not to mention hospital accommodation, staff and clothing. It would be economically sound therefore to treat all in-door patients with urea stibamine or some similar compound of antimony in hospitals where competent medical officers are available. The toxic effects of such a potent drug and its cost at present prohibit its general use in out-door work.

Hookworm disease.—Hookworm disease is general in Assam as is shown from the returns of jails and tea gardens where examinations are made.

An extensive campaign against this disease would entail much expense. Although there may not be striking evidence of this disease, nevertheless the anemia, general debility and poor physique which result from it swell the death-rate and it is an economic handicap in the province.

Leprosy.—The Medical Department proposes in 1925 to have a special survey of leprosy in four selected districts as a preliminary move to a general investigation on, and action against this disease.

THE EIGHTH ANNUAL REPORT OF THE KING EDWARD VII MEMORIAL PASTEUR INSTITUTE AND MEDICAL RESEARCH INSTITUTE, SHILLONG FOR THE YEAR ENDING 31ST DECEMBER 1924. SHILLONG: GOVERNMENT PRESS, ASSAM, 1925. PRICE 12 ANNAS.

During the year the total number of persons who completed treatment was 1,831, of which number 94 were Europeans. Nineteen patients absconded. Twenty discontinued treatment as the dogs which bit them were certified alive and well ten days after biting; and one patient died during treatment; these forty cases have not been included in the total.

There has been a decrease as compared with 1923, of 540 or 22.7 per cent. of persons treated in 1924.

The decrease was due to the opening of a Pasteur Institute in Calcutta about the middle of the year with the result that the Bengal cases ceased coming to this Institute for treatment.

In spite of this, the number treated during the year was greater than in any previous year with the exception of 1923. A further decrease in the total number treated must however be expected in the following year owing to the above cause.

The number of deaths from hydrophobia was fourteen; of these five died more than 15 days after completing treatment. All were Indians. The total hydrophobia rate, 14 deaths out of 1,831 cases is 0.76 per

cent., and the total failure rate, 5 deaths out of 1,831 cases is 0.27 per cent. No Europeans developed hydrophobia.

Seven hundred and sixty-four or 42 per cent. of the patients came from Bengal, as compared with 1,361 in 1923. Ninety-one cases came from Bihar and Orissa, and two from the United Provinces.

Seventeen per cent. of the cases were bitten by jackals. The hydrophobia rate for jackal bites is 1.9 per cent. as compared with 0.54 per cent. for dog bites. It would appear from the statements of patients that 745 or 29 per cent. did not come for anti-rabic treatment.

BACTERIOLOGICAL AND CLINICAL RESEARCH SECTION.

The total number of examinations was 2,530 as against 2,347 in 1923. Owing to the setting up of a kala-azar Commission with the special object of research into the method of spread of kala-azar in India and composed of Lieutenant-Colonel S. R. Christophers, C.I.E., I.M.S., Major H. E. Shortt, I.M.S., and Captain P. Barrand with headquarters at the Institute, research work in the Institute itself was concentrated on the improvement of the treatment of kala-azar by various organic salts of antimony: urea-stibamine, Von Heyden 471, and stibamine glucoside have so far been tested.

Kala-azar hospital.—The number of patients admitted during the year was 204, and 7 cases remained at the end of last year, giving a total for the year, of 211.

ANNUAL REPORT ON THE ADMINISTRATION OF JAILS OF THE BENGAL PRESIDENCY, 1924. BY LIEUT.-COLONEL W. G. HAMILTON, I.M.S., INSPECTOR-GENERAL OF PRISONS, BENGAL PRESIDENCY (OFFG.). CALCUTTA: BENGAL SECRETARIAT BOOK DEPOT, 1925. PRICE RS. 10-8-0.

Some of the principal points of interest in jail administration in 1924 are:—

Decrease in the jail population.

- Institution of Advisory Boards for the premature release of prisoners fulfilling certain conditions.
- Decrease in the number of corporal punishments. Extension of the remission system to prisoners sentenced to six months and upwards.
- Abolition of imposition of fetters for safe custody in district jails.
- Increase in the number of State prisoners under Regulation III of 1818 and detenus under Ordinance I of 1924.
- Influx of Satyagraha prisoners during the months of May, June, July and August.

There seems to be a progressive decrease in the jail population, the figures have been falling year by year since 1922.

Satyagraha Prisoners.—Owing to the dispute about the ownership of the Tarakeswar temple about 1,750 Satyagraha prisoners were admitted into jail. Hooghly, Bankura, Burdwan, Krishnagar and Berhampore jails were all filled with these troublesome prisoners.

The great majority of the Satyagraha prisoners were undisciplined school boys who should never have been sent to jail, few of these prisoners were above 18 years of age and some were as young as 10 years. The Satyagrahis refused to obey any rules and expected to be treated as special class prisoners. They caused disturbances in all the jails to which they were sent. It is to be regretted that some method other than imprisonment cannot be devised for this class of offenders.

State prisoners and detenus.—A marked feature of 1924 was the increase in the number of political prisoners. They comprise two classes:—

(a) State prisoners detained under Regulation III of 1818, and

(b) *Detenus* under the Ordinance of 1924.

There is no distinction in treatment between these two classes of prisoners.

It does not seem to be thoroughly understood by the general public that State prisoners and *detenus* are not sent to prison for punishment but only for safe custody. They are kept quite separate from ordinary prisoners and have a daily allowance for food which they can spend as they like. Government has provided a liberal sum of money for the purchase of books, and outdoor recreation is obtained by badminton or tennis in their own enclosure. The health of most of these men has been good and nearly all have put on weight since their detention in jail.

Warder guard.—The number of punishments inflicted on warders was 922 against 884 in the previous year. Of the punishments inflicted departmentally, the number of dismissals was 32, degradation or suspensions 7, fines 396, extra drill 154 and censures or other punishments 324. Judicial punishments numbered 9 against 10 in the previous year. Seventeen warders resigned against 30 in 1923.

Escapes and recaptures.—During the year there were 10 escapes among convicts, 1 from inside and 9 from outside the jails, 6 of whom were recaptured before the close of the year.

Numerous improvements are contemplated in the Juvenile Jail. The accommodation is at present not satisfactory and the work that they are giving is not suitable.

The number of boys under the age of 15 admitted for short terms of imprisonment, 7 days to 3 months, was 39 this year: this shows a decrease in this deplorable practice.

During the year 202 convicts were deported to the Andamans and 193 were repatriated on medical grounds.

Employment in Jails.—There is a jute mill in the Presidency Jail which employed an average of 580 convicts. The output during the year was 943,081 yards of gunny cloth as well as gunny bags, surgeon's tow, etc., that was supplied to various Government departments. In the workshops where such things as iron degchis were made, 289 convicts were employed.

In the Alipore Jail the principal industry is printing. Manufactures of chaukidari cloth and tailoring are the main employments in the Midnapore, Rajshahi and Dacca Jails.

Sickness and Mortality.—The daily average number of sick shows a steady decline and is lower this year than during any of the last five years. The death rate is also lower than the quinquennial average but higher than last year. The main causes of death are pneumonia, pulmonary tuberculosis and dysentery, these three diseases account for about half the total deaths.

REPORT ON THE STATISTICAL RETURNS OF THE PROVINCIAL MENTAL HOSPITAL IN ASSAM FOR THE YEAR 1924 BY COLONEL C. H. BENTLEY, C.I.E., K.H.P., I.M.S., INSPECTOR-GENERAL OF CIVIL HOSPITALS, ASSAM. SHILLONG: ASSAM GOVERNMENT PRESS, 1925. PRICE 8 ANNAS.

LIEUTENANT-COLONEL W. D. RITCHIE, I.M.S., held charge of the Provincial Mental Hospital at Tezpur during the year.

The total number of lunatics confined in the hospital at the close of the year 1923 was 437 of whom 352 were males and 85 females. During the year under report 70 (58 males and 12 females) were admitted into the Mental Hospital.

There was no re-admission during the year.

The total number of admissions to hospital was 143 against 222 in 1923, with a daily average sick of 32.78 against 32.92 in the previous year, the cases of epilepsy being excluded; the daily average of which was 36.19 against 34.67 in 1923.

The fall in number of admissions to hospital was due to less admissions under malaria, pyrexia of uncertain origin and under the heading "all other diseases."

The percentage of new admissions with bad health was 16.44, with indifferent health 57.53 and with good health 26.03 against 17.14, 48.57 and 34.29, respectively, in 1923. There were 22 deaths during the year against 30 in 1923. Amongst these 22 deaths, one committed suicide by hanging at night, two were killed by a criminal lunatic with the iron head piece of a hospital bedstead and one was admitted in a moribund condition with bad diarrhoea and died 21 days after admission.

It is fully recognised by Government that the accommodation in the Mental Hospital is far below requirements, and that the type of buildings is thoroughly unsatisfactory. At the request of Government a special report was submitted on the suicide and the double murder which occurred during the year and as ordered by Government rough plans and estimates have been drawn up for practically rebuilding the entire Mental Hospital, the estimate exceeding 7 lakhs of rupees.

THE ANNUAL REPORT OF THE DIRECTOR OF THE PASTEUR INSTITUTE OF SOUTHERN INDIA, COONOR. MADRAS. 1924-'25 SUPERINTENDENT, GOVERNMENT PRESS, MADRAS, 1925.

THE number of patients who were treated in this Institute during the year was 489, a decrease of 865 on the number treated during the previous year. The decrease was due to the whole area served by the institute having come under the operation of the new system whereby antirabic vaccine is issued to numerous centres for use locally. Up till about 2½ years ago all persons desiring anti-rabic treatment had to travel to Coonoor to obtain it.

Out of the total of 489 patients, 218 came from Coimbatore district although the treatment was available in Coimbatore itself.

There was an increase of 710 during the year in the number of persons treated in local centres.

The percentage of returns received is as follows:—

| | | |
|--|----|--------------|
| Patients who completed the full course of treatment | .. | 56 per cent. |
| Patients who did not complete the full course of treatment | .. | 5 " |
| No returns received | .. | 37 " |

It is very important that the institute should know what happened to the persons treated with the anti-rabic vaccine issued. If Tanjore, which treated 165 persons, can report on 164 of them, it seems probable that districts which have sent in either no returns or only a small proportion could help in greater measure.

ANNUAL REPORT OF THE EXECUTIVE HEALTH OFFICER, BOMBAY FOR THE YEAR 1924. BOMBAY: THE TIMES OF INDIA PRESS, 1925.

A few extracts are given from this interesting report by J. E. Sandilands, M.B., D.P.H., Executive Health Officer, Public Health Department, Municipal Offices, Bombay:—

"The number of live-births registered during the year under review was 21,838, being 843 more than in

1923 and the highest on record since 1866. The birth-rate in the year per 1,000 persons living was 17.61 as against 17.20 in the preceding year.

The total deaths during the year numbered 38,774, being 815 more than in 1923 but 9,889 less than the average of the last quinquennium (1919-1923) and 3,346 less than the average of the preceding ten years (1914-1923). The death rate in the year per 1,000 persons living was 31.27.

Plague caused 409 deaths against 1,329 in 1923. The number of deaths was the lowest recorded in any year since the outbreak of the disease in the city in 1896, with the exception of the year 1920 when the deaths from plague fell to 282.

Small-pox was epidemic for 18 weeks from 10th February 1924 and caused 1,242 deaths as compared with an annual average of 494 deaths in the decennium (1914-1923). The incidence of small-pox was also severe in the adjoining districts of the Presidency.

Malaria accounted for 488 deaths as against 403 in 1923, 401 the average for the five years 1919-1923, and 313 the average for the ten years 1914-1923.

During the year the deaths among infants under one year of age numbered 9,156 and the rate of infant deaths per 1,000 of births registered was 419 as against a rate of 411 in 1923 and 478 in the ten years (1914-1923).

Compared with the decennial averages (1914-1923), the total number of deaths shows a decrease of 3,346.

Births and Birth-rates.—Excluding 1,821 still-born children, the number of births registered during the year was 21,838 and was more by 843 than in 1923 and 1,306 more than the annual mean number of births registered in the ten years (1914-1923).

The birth-rate calculated on the estimated population for 1924 was equivalent to 17.61 births per 1,000. Calculated on the census population for 1921, the birth-rate was 18.57.

The low birth-rate recorded year by year for the city is partly due to the custom whereby married women leave the city for their confinement and register their children in the *mofussil* districts where they are born. In part it is due to the fact that a certain number of births in the city are not registered.

Infant mortality.—The number of deaths among infants under one year of age was 9,156, being 524 more than in 1923, but 658 less than the annual average in the ten years 1914-1923.

The infant mortality rate expressed as the number of deaths in infants per 1,000 registered births was 419 as compared with a rate of 411 in 1923 and of 478, the annual average in the decennium (1914-1923).

On the whole it seems probable that the recorded rates for Bombay both absolutely and comparatively overstate considerably the magnitude of the rate of loss of infant life.

Of the total deaths among infants, 2,053 or 22 per cent. took place in the first week of life and 1,353 or 15 per cent. in the age-period 1 to 4 weeks.

Infant mortality by Races.—Members of certain castes appear to habitually evade the registration of the births of their children. The rate for Jains for example exceeds 1,400 and would imply that the deaths among Jain infants were nearly one and a half as many as the number of infants in the Jain community.

Among Europeans and Parsees the registration of births may be assumed to be carried out in almost all cases. Nevertheless their recorded rates exceed 170 as compared with rates of less than 100 in England in spite of the fact that the proportion of the poor and very poor in these communities is insignificant compared with that of most of the other communities in Bombay.

The high rates recorded in all communities suggest the presence in Bombay of some adverse factor in addition to the poverty and ignorance which are chiefly responsible for high rates in western countries. The

added factor affecting all classes is probably malaria; another factor which can hardly fail to enhance the infant mortality among the more ignorant portions of the population is the practice of soothing babies by the administration of opium.

Prevention of infantile mortality.—The work which is being done in Bombay for the reduction of infant mortality may be described under the following heads:—

- (i) Visits by the municipal district nurses for the purpose of getting into touch with prospective mothers and for discovering cases of sickness, especially among women and children and unvaccinated children; for inquiry into the condition of new-born infants; and for giving instruction by homely talks as to the care and rearing of children.
- (ii) Attendance on confinements.
- (iii) Provision of necessities and comforts during the lying-in period.
- (iv) Maternity Homes.
- (v) Infant Milk Depôts.
- (vi) Infant Welfare Centres.

Plague.—During the year plague assumed epidemic proportions for seven weeks from 2nd March to 19th April 1924. The number of plague attacks during the year was 450 against 1,501 in 1923. The disease caused 409 deaths in the year against 1,329 in 1923 and 1,213 the average for 1914-1923. The mortality among reported cases was 90 per cent. as against 89 in the previous year.

Plague measures.—The usual preventive and precautionary measures such as (i) inoculation, (ii) rat destruction, (iii) evacuation, and (iv) disinfection were continued during the year.

(i) *Inoculation.*—The number of inoculations performed during the year was 6,689 against 13,749 in 1923.

(ii) *Rat destruction.*—The total number of rats collected and destroyed during the year was 701,657 against 725,574 in 1923. It will be seen from the following statement that of the 701,657 rats collected and sent to the Parel Laboratory, 326,291 were examined and 3,776 were found infected, giving a ratio of 1.16 infected rats per 100 rats examined as compared with a ratio of 2.77 in 1923.

The percentage of infected rats rose from 1.01 in January to 3.36 in March and then declined gradually to 0.13 in December.

(iii) *Evacuation.*—For the reception of contacts from infected dwellings, temporary municipal health camps were established, as in previous years.

(iv) *Disinfection.*—For the destruction of fleas, all rooms in which cases of plague either in rats or in men had occurred were disinfected with Pesterine. Infected bedding is disinfected by steam.

Small-pox.—Small-pox was prevalent in the city throughout the year and caused 1,242 deaths against 479 in 1923 and 494 the average for the preceding ten years (1914-1923). The number of attacks from small-pox registered during the year was 2,097 (including 49 imported cases) against 978 attacks in 1923.

Vaccination.—There are 19 vaccination stations in the city.

The total number of primary vaccinations and of re-vaccinations performed during the year was 20,135 and 26,508 respectively as against 20,293 and 21,153 in 1923.

The proportion of primary vaccinations (13,758) in children under one year of age to the total number of births (21,838) registered during the year was 63 per cent.

Of the 218 infants under one year of age who died of small-pox during the year, 157 were not vaccinated and 4 were vaccinated during the incubation period. In the remaining 57 cases, the vaccinal condition was not ascertained.

Tuberculosis.—The number of deaths from tuberculosis was 1,568 and the death-rate 1.26 per 1,000 of

the population. Of these, 1,428 were due to phthisis (pulmonary tuberculosis) and 140 to other tuberculous diseases.

The Anti-Tuberculosis League.—The work in connection with the prevention and treatment of tuberculosis in the city, formerly carried out by the King George V Anti-Tuberculosis League, was taken over by the Municipality from July 1923. There are two dispensaries for out-patients suffering from tuberculosis.

Each dispensary is in charge of a medical officer and three nurses are employed for visiting the patients who attend, reporting on their house conditions and seeing that they follow in their homes the advice which they receive. Of the three nurses, two are employed at Princess Street and one at Foras Road.

During the year under report the total number of tuberculous patients treated at the two dispensaries was 1,302; the number treated in 1923 was 1,129.

Malarial-Fever.—There was a decided increase of malaria in September and October after the rainy season. The comparatively low rainfall and its intermittent nature may be held to account in part for this prevalence which has been so much in excess of the usual monsoon increase. For the rest the excessive incidence which has been experienced at the same time throughout the Presidency and beyond, under varying monsoon conditions, suggest an exaltation in the virulence of the parasite common to all districts on this side of India.

The following tables shows the summary of work done in the year 1924 in connection with malaria prevention:—

| | |
|---|--------|
| Number of wells filled in | 102 |
| " " " hermetically covered | 17 |
| " " " covered with trap doors | 23 |
| " " " inspections of buildings | 90,199 |
| " " " notices issued for wells | 453 |
| " " " " " cisterns, etc. | 1,373 |
| " " " " " cisterns made mosquito-proof | 2,779 |
| " " " " " provided with standard covers | 2,054 |
| Number of children examined for enlargement of the spleen | 10,678 |
| Number of blood slides (random sampling) examined | 2,098 |
| Number of blood slides of dispensary patients | 689 |
| " " " quinine pills distributed (2 grs.) | 9,850 |
| " " " " " " " " (4 grs.) | 8,200 |
| " " " " " " " " (5 grs.) | 700 |
| " " " Cinchona febrifuge tablets distributed | 32,274 |
| Number of pools treated with pesterine or kerosine emulsion | 2,433 |
| Number of old receptacles removed | 9,697 |
| " " low-lying areas, filled in | 40 |
| " " big tanks filled in | 2 |
| " " correspondence papers (new cases) dealt with | 3,797 |

Milk Supply.—A considerable advance has been made by the Dairy Superintendent during the year towards the solution of the problem of removing from the city the milch-cattle stables which are so fertile a source of nuisance and complaint.

Land is to be purchased and stables erected by the Municipality at Trombay for the reception of milch-cattle from the city.

In addition to the Trombay scheme for bringing milk in from the suburbs, negotiations have been set on foot with a view to encouraging the production of milk by private enterprise at much greater distances from Bombay in the country where the conditions fulfil the requirements of economic dairy farming.

A total quantity of 23,000 gallons per day is consumed; this is equivalent to 3.1 ounces per head of the population, an amount which must be regarded as insufficient for the consumers, of whom a majority are vegetarians.

In the non-vegetarian diet of a healthy adult efficient substitutes for milk can no doubt be provided, but for

children up to the age of 12 or 14 years and for vegetarians milk may be regarded as essential.

The combined needs of the total population may be stated as amounting to not less than an average of 5 ounces of milk per head per day, which is the average in London. In New York the average exceeds 11 ounces.

Of the milk consumed 78 per cent. is produced in milch-cattle stables within the city, and 1 per cent. is brought in from the suburbs by road. Twenty-one per cent. comes by rail.

During the year 2,130 hawkers importing milk by train were inspected. Nine hundred and twelve were found to have no licence and 713 were carrying the milk in open cans without covers.

Prosecutions were instituted in 346 cases of hawkers found selling milk in the streets without a licence.

Water-supply.—The quantity of water available throughout the year has been well above the average, but the supply is intermittent and the pressure insufficient in many cases to fill the storage cisterns on the roofs of high buildings. Serious nuisance thus arises through the failure of the supply for flushing tanks of water-closets.

No relief will be obtained until the third pipe line from Tansa Lake has been completed. The construction of this pipe line is progressing rapidly.

The filter for the water from Pawai Lake has been completed and progress is being made with the construction of filters for the Vehar and Tulsi Lake supplies. During the rains the water from Tansa Lake was treated with chlorine gas from cylinders passed through the chloronome now installed at Ghatkopar, some 5 miles beyond the city limits.

During the year the water-supply from all sources was unfiltered.

Correspondence.

A USEFUL DIGITALIS TINCTURE.

To the Editor, INDIAN MEDICAL GAZETTE.

SIR,—In my article "Clinical Studies on Digitalis in Bengal," which appeared in the *Indian Medical Gazette* of April 1924, it was stated as a result of therapeutic tests on a large series of cases of heart failure in Calcutta that there is no tincture of digitalis that acts in the dose of 5 to 8 drms. as in Europe and America. On the other hand, it was essential and imperative to use massive doses of 2 drms. every day for 8 or 10 days before any conspicuous benefit was obtained.

Several months before this article appeared, the writer was in communication with Messrs. Parke Davis & Co., as a result of which several samples of a new and extremely potent tincture were generously placed at the disposal of the writer. Carefully controlled clinical trials were given on a fairly large number of cases of heart failure, with or without auricular fibrillation. The results were uniformly good and most of the cases developed minor toxic digitalis effects directly a total dose of 5 drms. in 5 days was reached.

Later on, some samples of this new tincture were biologically assayed and the results as worked out by Major R. N. Chopra and Captain P. De and the writer revealed that the same potency was found on cats; in fact, 1 cat-unit was contained in less than 1 c.c. of this tincture.

Therefore making allowance for the effects of climate and the delay in the drug being administered in India, there still remains adequate potency to yield results with the same doses as worked out in Europe and America.

It is therefore an encouraging sign that the above potent tincture has now been placed within the reach of every practitioner in India; the chemists must be congratulated on taking up this matter so promptly. This tincture is called Digifortis.

One word of advice is not superfluous; in Calcutta it is essential to stick to a daily dose of 1 drin. a day in order that the best results may be obtained without much delay. It is of course common knowledge that most of our heart failure cases in Bengal seek medical relief when about to cross the Rubicon, and it is therefore imperative to use adequate doses and get quick results before it is too late.—Yours, etc.,

S. C. BOSE, M.B., M.R.C.P., D.T.M. (Lond.).

86, SOUTH HILL PARK,
HAMPSTEAD,
LONDON, N.W.3.
3rd September 1925.

TINCTURE OF IODINE IN DYSENTERY AND DIARRHOEA.

To the Editor, INDIAN MEDICAL GAZETTE.

SIR,—I have tried tincture of iodine in dysentery and diarrhoea in more than 100 cases and found that excepting a few cases all of them were cured by tincture of iodine administered in ten drops doses three times a day. In order to avoid burning in the throat due to tincture of iodine, I used to add a drachm of glycerin per dose.

I had noted that though some bad cases did not show improvement in 24 hours, still they decidedly showed marked improvement in 48 hours.

I also tried tincture of iodine in malaria and acute gonorrhoea but I was disappointed with the results in these cases though some cases of malaria did improve.

I have found that about 4 injections of the following solution are very useful in curing gonorrhoeal epididymitis without any external application or internal medicine.

| | | | |
|-----------------|----|----|-------|
| Iodum | .. | .. | gr. 6 |
| Potas. Iodide. | .. | .. | gr. 6 |
| Aqua Distillata | .. | .. | oz. 1 |

About 40 minims of the above solution is injected every time on alternate days.—Yours, etc.,

P. N. SHAH, M.B., B.S.,
Medical Officer, Baroda.

MEDICAL STORES,
BARODA,
7th September 1925.

A CASE OF MALIGNANT PUSTULE.

To the Editor, INDIAN MEDICAL GAZETTE.

SIR,—I have read with interest the case described in page 428 of September issue of your journal regarding the incidence of malignant pustule. I had a case which I describe as follows:—

A Muhammadan male, aged 30 years, was admitted to Dumka Sadar Hospital on 18th July 1925. The clinical signs of his ulcer were—right side of face inflamed and swollen distinctly; under the lower eyelid and on the upper part of the cheek was an ulcer $2\frac{1}{2}$ in \times 1 in.; in its centre was a black slough $1\frac{1}{2}$ in \times $\frac{1}{2}$ in. quite fixed to its base; I tried to remove the slough by forceps but I did not pull for fear of unnecessary bleeding; the man had it for one week and had little fever at the beginning; he came to the hospital walking and was not at all ill.

Treatment given—hot fomentations to the ulcer twice or thrice a day; after 4 days the inflammation of the face was much less and he could easily open his right eye. The ulcer was reddish and the slough was decreasing in size. After seven days more he went home to attend a religious festival. He came for the cure of his ulcer after the festival and four days after his re-admission he was cured.

Under microscope—a piece of sloughy tissue when stained showed distinctly anthrax bacilli.

Peculiarities—he had very little toxic symptoms and was not connected with hide business but is an ordinary cultivator of land.

Capt. Pereira, Civil Surgeon, took special care of this man and stained the smears finding the *Bacillus anthracis*.—Yours, etc.,

R. K. BASU,

Medical Officer, Dumka Sadar Hospital.

DUMKA SADAR HOSPITAL,
DUMKA, the 19th September 1925.

OBITUARY.

Brigade Surgeon Lt.-Colonel Wellington Gray, I.M.S.

We regret to announce the death of Brigade Surgeon Lieutenant-Colonel Wellington Gray, I.M.S., which occurred at the age of 83 at 22, Glyn Mansions, West Kensington, London, on July the 15th, 1925. After obtaining his L.M. and L.Ch. degrees from Dublin he passed into the Indian Medical Service on May the 31st, 1866 and arrived on the shores of India on November, the 9th of the same year and took up the duties of Professor of Anatomy and Curator of the Museum in the Grant Medical College, and Second Surgeon to the Sir Jamsetjee Jejeebhoy Hospital, Bombay. He showed infinite patience, care, diligence and industry and gave ample proof of his great surgical skill and aptitude in the art of teaching anatomy while holding this chair from 1866 to 1871.

Colonel Gray made the students realise that the study of anatomy was not merely an accomplishment for the Inter. M.B., B.S., but an essential requisite for the art of surgery. His love of anatomy is immortalised by the "Wellington Gray Medal" which is awarded every year to the best anatomist of the Grant Medical College after a special competitive examination.

Botany was however his one great hobby; he acted as Professor of Botany from 1871 to 1883.

To him is due the credit of laying out so beautifully the grounds of the above mentioned College and Hospital. He was Professor of Surgery and Senior Surgeon from 1882 to 1893 and Principal of the Grant Medical College from 1889 to 1893. He was also Senior Medical Officer to the Sir J. J. Hospital. He was a man of great erudition, untiring energy, and had a keen sense of the dignity of the medical profession which he always upheld.

In Bombay his numerous pupils have the highest respect and regard for him as one of the greatest teachers that have adorned the staff of this institution. A man of extraordinary endowments, he had a brilliant career in the service, and when, in 1893, Colonel Gray retired and left India, after a devoted service of 26 long years in an unbroken connection with the Grant Medical College and J. J. Hospital, the College and the Bombay medical profession felt the loss very keenly. He had a very sympathetic personality which attracted around him a vast number of devoted friends both in the college and outside. He was one of the noblest officers of the Indian Medical Service and will always be remembered as a worthy member of that noble hierarchy of devoted and brilliant medical men (such as Moorehead, Vandyke Carter and others) who have guided the destinies of the Grant Medical College in the past.

Service Notes.

APPOINTMENTS AND TRANSFERS.

Lieutenant-Colonel H. W. Pierpoint, F.R.C.S. I.M.S., is appointed as Superintendent, X-Ray Institute, Dehra Dun, with effect from the afternoon of the 5th October 1925.

The services of Major J. L. Sen, M.C., I.M.S., on relief by Lieutenant-Colonel Pierpoint, are replaced at the disposal of the Government of Assam.

Major J. B. Lapsley, M.C., I.M.S., is appointed Officer-in-charge, Medical Store Depot, Madras, with effect from the 4th November 1925.

Major R. F. D. MacGregor, I.M.S., an Officiating Agency Surgeon, on return from leave, is posted as Agency Surgeon in Bhopal, with effect from the 16th September 1925.

Major G. Covell, M.D., I.M.S., is appointed temporarily to the Medical Research Department and posted as a supernumerary officer at the Central Research Institute, Kasauli, with effect from the 2nd October 1925.

Major R. W. G. Hingston, M.C., I.M.S., is appointed Surgeon Naturalist, Marine Survey of India, with effect from the 25th September 1925.

The services of Major F. J. Anderson, M.C., M.B., F.R.C.S., I.M.S., are placed permanently at the disposal of the Government of Madras, with effect from the 27th February 1925.

The services of Major A. G. Tresidder, M.D., I.M.S., are placed temporarily at the disposal of the Government of Bombay, with effect from the 1st April 1925.

In modification of previous orders, the services of Captain P. Verdon, I.M.S., are placed permanently at the disposal of the Government of Madras, with effect from the 26th November 1924.

The services of Captain A. M. Ghosh, M.B., I.M.S., are placed temporarily at the disposal of the Government of Bihar and Orissa, with effect from the date on which he assumes charge of his civil duties.

Captain R. Hay, I.M.S., an Offg. Agency Surgeon and Agency Surgeon in Bundelkhand, on return from leave, resumed charge of his appointment, with effect from the 29th September 1925.

LEAVE.

On being relieved of his appointment as officiating Surgeon-General with the Government of Bengal, Colonel R. P. Wilson, C.I.E., V.I.S., F.R.C.S., I.M.S., is allowed leave for six months with effect from 17th September 1925.

Lieutenant-Colonel D. P. Gail, M.B., F.R.C.S.E., I.M.S., Civil Surgeon, Howrah, is granted leave on average pay for thirteen days, with effect from the 3rd October 1925.

Major J. B. Lapsley, M.C., I.M.S., Officer-in-charge, Medical Store Depot, Madras, is granted sixty days privilege leave combined with ten months furlough, with effect from the 4th November 1925.

Major W. J. Simpson, I.M.S., an Officiating Agency Surgeon, is granted leave on average pay for eight months, combined with leave on half average pay for four months, with effect from the 11th September 1925.

PROMOTIONS.

Lieutenant-Colonel to be Colonel.

Corrie Hudson, C.I.E., D.S.O., F.R.C.S.E., *vice* Colonel Frederic Linton Blenkinsop, M.B., with effect from the 4th September 1925. Colonel Hudson's tenure of appointment will reckon from the 7th September 1925.

Major (now Lieutenant-Colonel) J. D. Graham, C.I.E., M.B., I.M.S., to be acting Lieutenant-Colonel from 3rd March to 28th April 1916, and from 24th December 1916 to 27th December 1919, whilst employed as Assistant Director of Medical Services in Mesopotamia.

RESIGNATIONS.

Captain Manohar Lal Bhagat. Dated 1st September 1925.

Captain Keshav Ganesh Mohile, M.C. Dated 1st September 1925.

RETIREMENTS.

The King has approved the retirement of Colonel E. L. Blenkinsop, M.B., I.M.S., from service with effect from the 4th September 1925.

The King has approved the retirement from the service of Lieutenant-Colonel F. O. N. Mell, C.I.E., M.D., I.M.S., with effect from the 29th August 1925.

NOTES.

PETROLAGAR.

THIS is a perfectly stable homogenous and highly palatable emulsion of the purest mineral oil and prepared agar-agar.

It combines the well-known lubricating properties of mineral oil with the increased volume of the intestinal content associated with the administration of agar-agar. It marks a real advance in the treatment of constipation since the Petrolagar emulsion has properties which distinguish it from plain mineral oil on the one hand and agar-agar on the other.

The oil in Petrolagar is so finely subdivided that it mixes perfectly with the faecal content. This ensures a soft plastic mass which passes evenly through the bowel. The agar-agar is also very finely divided. It has a greater absorption capacity than that of ordinary shredded or powdered agar and increases the volume of the intestinal matter.

Petrolagar is non-habit forming. It is highly palatable and is readily taken by those to whom oil in any other form is objectionable. Whilst thoroughly lubricating the bowel, all danger of oil leakage from the rectum is eliminated.

Petrolagar is a distinct advance in the treatment of chronic constipation, intestinal stasis and mucous colitis.

In the treatment of the intestinal atony which lies at the root of chronic constipation, it has given, as a large volume of clinical evidence proves, results unobtainable by any other method of medication.

In inflammatory conditions of the large bowel, Petrolagar exerts a soothing protective action which allays pain and irritation. It is also anti-fermentative and very helpful in intestinal flatulence and distension.

In haemorrhoids Petrolagar effects an easy evacuation, so that there is no straining. It supersedes saline purges and those aperients which owe their effect to irritation.

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